An independent magazine published by ECC Publications
September 1983

Sinclair User

Issue No 18

NEW THIS MONTH — SOFTWARE DIRECTORY

140 pages for only 75p

FREE OFFER IDEAL FOR NEW USERS



QUEST FOR GOLD

ZX-81 HELPS TOP PENTATHLETE — User of the month

How to write your own chess program

Take a 3D look at games

LAST CHANCE TO WIN A PROGRAMMING FORTUNE

Meet Sinclair's moneyman — Inside Sinclair

Move up to Forth on the Spectrum

Buying second-hand — the pitfalls

PAGES OF THE BEST PROGRAM LISTINGS

COMPETITION-PRO

JOYSTICK

PRECISION GAME CONTROL!



Outstanding Features

- Self centreing stick
- Super strong nylon and steel construction
- A total of 8 directions *plus* 2 large fire buttons (for left or right handed operation)
- Arcade proven moulded leaf switches ensure incredible reliability
- Complete with boxed interface on Spectrum models
- A wide range of Joystick compatible software readily available from W H Smith and leading computer shops or direct from us

Access
BARCLAYCARD VISA

NEW

Conversion Tape I Only £4·95 – Converts seven leading arcade games to run with the Kempston Joystick: Horace Goes Skiing – Sinclair, Hungry Horace – Sinclair, Flight Simulation – Sinclair, Arcadia – Imagine, Penetrator – Melbourne House, Spectres – Bug Byte, Space Zombies – Mikrogen.

ALSO

Conversion Tape II Only £4·95 – Converts: Orbiter – Silversoft, Escape – New Gen, Tanx – DK 'Tronics, Centipede – DK 'Tronics, Spectral Invaders – Bug Byte, Cruising On Broadway – Sunshine, Frenzy – Quicksilva (Early Versions).

Joystick Compatible Spectrum Software now available from Kempsoft:
■ Astro Blaster ■ Blind Alley ■ Cosmic Guerilla ■ Cosmos ■ Cyber Rats ■ ETX ■ Frenzy ■ Frogger ■ Galaxians ■ Gulpman ■ Jet Pac ■ Joust ■ Knot in 3D ■ Mazeman ■ Meteoroids ■ Night Flite ■ PSSST ■ 3D Tunnel ■ Time Gate ■ Slippery Sid ■ Spookyman ■ Sheepwalk ■ 3D Painter ■ Bozy Boa ■ Violent Universe ■ Cookie ■ Tranz Am

Hardware I wish to order the following:		AMOUNT
☐ **New** Spectrum Joystick Interface, allows you to use any Atari/Commodore type joystick with Spectrum	@ £15·00	
☐ Spectrum Joystick including interface	@ £24·99	
☐ VIC 20, Commodore 64, Atari 400/800 Joystick	@ £14·50	
Please tick appropriate boxes All prices include P&P and VAT. Overseas prices add £4·00 P&P	TOTAL	

Cheques/postal orders should be made payable to Kempston (Micro) Electronics Ltd
Please debit my Access/Visa* Account (*delete as applicable)

Account No

Signature ______________ Name ______________

Address ______________

Please post to Kempston (Micro) Electronics, Dept SU9
Unit 30 Singer Way, Woburn Road Industrial Estate,
Kempston, Bedford.

SOLE UK DISTRIBUTOR

KEMPSTON
MICRO ELECTRONICS



sinclair user

incorporating Spectrum User

Editor
Nigel Clark
Consultant editor
Mike Johnston
Production editor
Harold Mayes MBE
Staff writer
John Gilbert
Program reviewer
Rebecca Ferguson
Illustrator/Designer
Brian King
Editorial director
John Sterlicchi
Advertisement manager
John Ross
Sales executive
Annette Burrows
Editorial assistant
Margaret Hawkins
Production assistant
Dezi Epaminondou
Managing director
Terry Cartwright
Chairman
Richard Hease
Sinclair User is published monthly by ECC Publications Ltd.

Telephone
All departments
01-359 3525

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:
Sinclair User and Programs,
ECC Publications,
196-200 Balls Pond,
London N1 4AQ

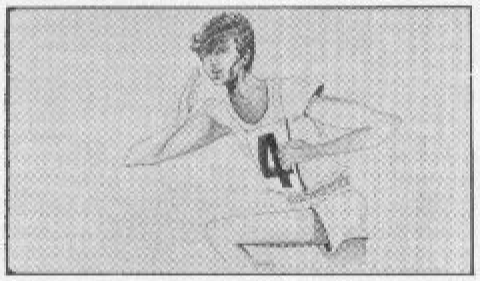
Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

ISSN No 0262-5458

Printed and typeset by
Cradley Print PLC,
Warley,
West Midlands

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road,
Holloway,
London N7
01-607 6411

Cover Photograph:
Press Agency York





NEXT MONTH

A special voucher which can be exchanged at Rumbelows is one of the many offers in the October issue of *Sinclair User*, plus the second half of the Software Directory.

End of mail order in sight?

AT LAST, the long-awaited Microdrives have arrived and that is official. We, the privileged members of the Press, have been introduced to one by Sir Clive. We had to be introduced because the finished article was not exactly what we expected from the earlier descriptions and the pictures which were shown in advertisements until only recently.

As seemed almost inevitable, it has aroused mixed reactions, many no doubt having had their expectations raised by the wait of more than a year since the 'revolutionary' storage system was announced. It will take some months, however, before a true assessment can be made of its worth and whether a decision to buy the Spectrum on the basis of the Microdrive was justified.

One difficulty which has already arisen is the possible non-compatibility with the Micronet 800 adaptor. That will limit the amount of information which can be downloaded from the Micronet system at any time.

With the time it has taken to get the two major developments in the Sinclair market this year off the ground it should have been possible to find compatible areas in which they could be attached to the Spectrum. Both will result in a large expansion of the uses of the Spectrum on their own but together the possibilities would have been multiplied.

It is a good idea for a company to keep its latest developments secret so that competitors do not have the opportunity to close the gap on its technical advances. It is not a good idea to keep associates so much in the dark that clashes of this kind occur.

On the more positive side, the Microdrive ROM which removes the bugs on the original Spectrum ROM and also allowed users to write their own versions of Basic are to be welcomed.

While the appearance of the Microdrive is a major event in the Sinclair year, it is likely that other developments in the last month will have a more lasting and important effect on the market.

The Microdrive is another addition to the growing list of improvements and expansions available to the users of home computers but the new ideas in other areas mark a major shift away from the traditional market base.

Since Sinclair Research began selling its first computer by mail order, that has been the traditional distribution channel for both software and hardware. A few specialist shops opened to begin the move towards over-the-counter sales and W H Smith gave that a big boost slightly more than 18 months ago when it began selling the ZX-81 in selected branches.

Other retailers, however, have been slow to show their enthusiasm for expanding the retail outlets, possibly because their experiences with machines other than Sinclair did not encourage them.

Two developments from Prism Micro Products are likely to ensure that retail outlets begin to expand rapidly. Prism is a sister company of ECC Publications, which publishes *Sinclair User,* but we make no excuse for considering that the company plans could lead to a revolution in home computing.

The rack-jobbing system and the Romox cartridge terminals are detailed in the news pages. Both will have the effect of making software much more easily available to the consumer and thus put home computing on the way to becoming a major leisure interest.

As shown in the recent Economic Intelligence Unit report, the United Kingdom has by far the biggest market for home computers in Europe. Easier access to software and hardware will make sure the U.K. maintains that position.

Both systems take many of the difficulties of selling software away from retailers. In the rack-jobbing system the retailer has only to be sure that sales will be sufficient to cover the costs of providing selling space. Decisions about which lines to stock and which to cease to stock will be taken out of their hands.

The Romox system will have similar benefits, with the added advantage that decisions by software houses about which programs to publish are made less crucial. New lines can be transmitted to the terminals and it can then be left to the consumers which they wish to buy, giving them a greater choice. It will also reduce the security problems of holding large amounts of valuable programmed cassettes.

As the recent theft of machines from Prism showed, thieves are beginning to appreciate the value of goods in the home computer market.

As stated here in previous months it is moves like these which are needed if home computing is to become as popular a leisure pursuit as photography or video.

A result of these changes will be that mail order will no longer be an important feature of the market. It will no doubt be retained by the smaller companies with confidence in their



products but for the most part sales will be through retailers with a distribution agreement with one of the growing number of distributors.

Another point made in previous issues is that the market appears to be following the example of the record industry, with software companies turning away from writing their own programs and marketing those of others. A more accurate blue-print would appear to be that of book publishing. That suggestion has been reinforced both by the Prism moves and the establishment of the first agent for software writers.

Neil Gibson and Co is offering to assess programs and arrange the best deal with a software house. The software house will then deal with marketing, having an agreement with a distribution company which will then deal with the retailers.

All that should be good news to enthusiasts who live outside the main population areas who have had to suffer the vagaries of mail order without having the opportunity to see what the games look like before buying. London has been well-served with shows at which most of the software producers have shown their products and the north has been similarly well-served with shows at Manchester and Leeds. People in Wales and Scotland, however, have had either to travel long distances or to trust to small retail outlets.

For Scottish enthusuiasts that should change in September when the first large ZX show is being staged near Edinburgh. *Sinclair User* will be taking the roadshow there with its advice stand and displays of games from the magazines and others should be able to provide a good day for the Sinclair-starved people north of the border.


PENETRATOR
'THE GRAPHICS ARE TRULY IMPRESSIVE'
Computer & Video Games

SINCLAIR ADD-ONS
MAJOR PRICE BREAKTHROUGH!

16K Memory extension for only £15.99!

MicroCare KEEPS YOUR COMPUTER HUMMING!

Spectrums and Dragons only £19.90 (inc. P + P)

ZX81 only £12.50 (inc. P + P)

Fully guaranteed for 12 months.

No, you're not dreaming! Those are the prices charged by MicroCare for repairing any electronic fault, however serious, in the above computers. They are £££££'s below the price of Sinclair's repair service, **and we give a guarantee!**

We'll return it promptly, and we'll quality check your unit before it leaves our service centre.

We have the experience it takes. We have the parts on hand. So act now. Let MicroCare get your computer humming again!

When sending in your computer, please enclose a brief description of the fault, and make sure that your address is clearly indicated.

Cheques to be made payable to MicroCare,

Order ref: **MC1 £19.90 inc. P + P**

MC2 £12.50 inc. P + P



FABULOUS SINCLAIR ADD-ON OFFER FOR ZX81 OWNERS

These are the real thing. ZX81 memory extensions made for the USA and specifically screened to stop radio interference.

- ★ **no soldering**
- ★ **easy to fit**
- ★ **simply plug in**
- ★ **no loss of memory through wobble or white out**

Fully Guaranteed for 12 months

ME1-16USA £15.99 plus 60p P + P



FANTASTIC ZX81 & SPECTRUM SS1 SPEECH SYNTHESISER SIZE 3½" x 5¾" x 1"

- ★ Making amazing speech effects with your ZX Spectrum.
- ★ Specially designed for use with your Spectrum. Just plugs in, no dismantling or soldering.
- ★ No power pack, leads, batteries or other extras.
- ★ Ample volume from built in loudspeaker, Manual Volume Control on panel. Can be plugged in to existing hi-fi system.
- ★ Uses no memory addresses.
- ★ Free Dictionary of Sounds.

SS1 SPEECH SYNTHESISER £39.00 plus 60p P + P

NEW TAPE LOAD ANXIETY?

Vu load takes the frustration out of loading your ZX81 or Spectrum programmes.

- ★ **helps to ensure programme load every time**
- ★ **monitors tape output level**
- ★ **gives positive save indication**
- ★ **detects blank tape without disconnecting cassette wires**
- ★ **ready to use – no wiring**

TL £19.99 plus 60p P + P

NEW MICRO TAPE

save it – first time on American microtape

- ★ **Specially designed for use with micro computers**
- ★ **Low drop out occurrance**
- ★ **Uniform coating**
- ★ **High saturation level**
- ★ **So good, we can guarantee them for 12 months**

AUDIO DIGITAL AD.C12 – 55p; AD.C15 – 60p; AD.C20 – 65p; + 40p P + P

NEW LOW PRICE Series B ONLY £20.50!

Spectrum 16K-48K

With our ME48 memory expansion add-ons your Spectrum can increase its capacity by up to three times.

- ★ no soldering
- ★ easy to fit
- ★ simple to plug in
- ★ fully guaranteed
- ★ no loss of memory through wobble or white out.

NB. Before ordering your Spectrum add-on please check which Spectrum you have in your possession. At the back of the ZX Spectrum the metallic contact strips can be clearly viewed. In the series A the space separating the strips is the same width as the strips. In the series B the strips are twice as wide as the space between.

SPECTRUM

ME16-48 Series A £34.50 plus 60p P + P
Series B £20.50 plus 60p P + P
ME16-80 Series B £46.00 plus 60p P + P

ZX81

ME1-64 £44.25 plus 60p P + P

FITTING/TESTING SERVICE. While you wait, personal callers Monday – Friday 9.30-5.00, £3.00. By return of post £7.00.

NEW LEVEL-VU PRISM

Allows you to see your tape counter without moving from your seat!

- ★ attaches easily to recorder body or lid
- ★ fits most recorders including Radio Shack, Vic-20, Atari
- ★ greatly magnifies counter numerals

LVP £3.99 plus 40p P + P

COMPUTER STANDS

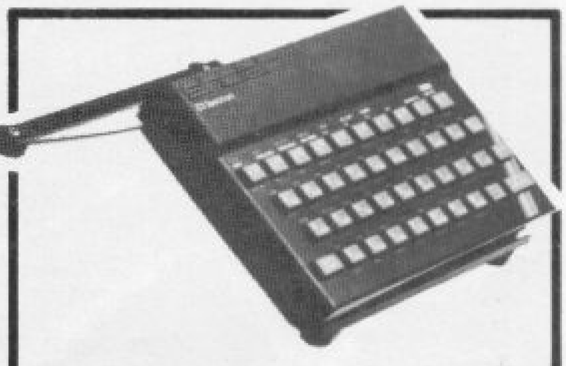
POWER BASE



Raised stand for ZX81 and Spectrum. Fitted LOAD/SAVE switch, and power ON/OFF for screen clearing. Saves wear and tear on connections. Front lip holds computer in place. No soldering, comes complete with all necessary plugs and cables.

Spectrum ref. PBS1 £13.50 plus 95p P + P

ZX81 ref. PBZX81 £13.00 plus 95p P + P



COMPUTILT STAND

Designed to tilt the computer to a better working position. Front lip holds computer in place. Also useful as a document stand when entering information.

Spectrum or ZX81 ref. CS1 £4.50

plus 60p P + P

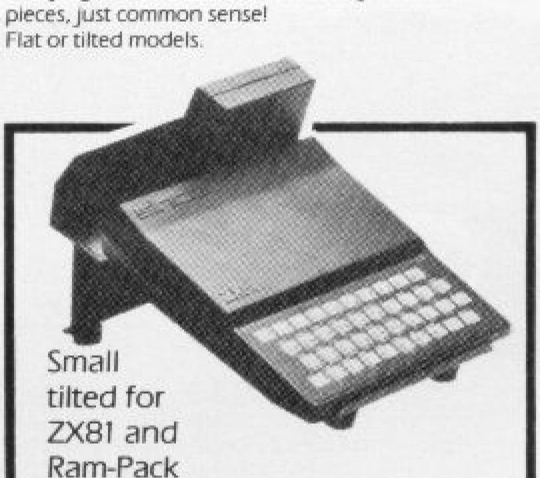
WOBBLE STOPPERS

At last, a fool proof method of avoiding ZX81 whiteouts caused by Ram-Pack wobble. Simply turn the plastic thumbscrew until the Ram-Pack is held firmly against the ZX81. No soldering no stick-on pieces, just common sense! Flat or tilted models.



Small flat ZX81 and Ram-Pack ref. SW

plus 60p P + P **£5.25**



Small tilted for ZX81 and Ram-Pack ref. STW

plus 60p P + P **£6.25**



Large flat or tilted for ZX81 and Ram-Pack and Printer ref.

LW **£5.75** (flat) LTW **£6.75** (tilted) plus 60p P + P

COMPUTER ADD ONS

7-9 Thane Works, Thane Villas, London N.7. Tel: 01-609 7919

Trade enquires welcome

ALL ITEMS NORMALLY DESPATCHED WITHIN 24 HOURS

Please tick appropriate box to order your Computer Add-On.

MC1 ☐ MC2 ☐ ME16USA ☐
ME16-48 Series A ☐ Series B ☐ SS1 ☐
TL ☐ ADC12 ☐ ADC15 ☐ ADC20 ☐
ME16-80 Series B ☐ ME1-64 ☐
LVP ☐ PBS1 ☐ PBZX81 ☐ CS1 ☐
SW ☐ STW ☐ LW ☐ LTW ☐

NB. Add Post and Packing to the price of each item. I enclose a cheque or postal order for ________ made payable/crossed to Computer Add-ons or MicroCare or I would like to pay by Access or Barclay Card and I enter my number and signature accordingly.

*Allow 28 days for delivery

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature ____________

Date ____________

Name ____________

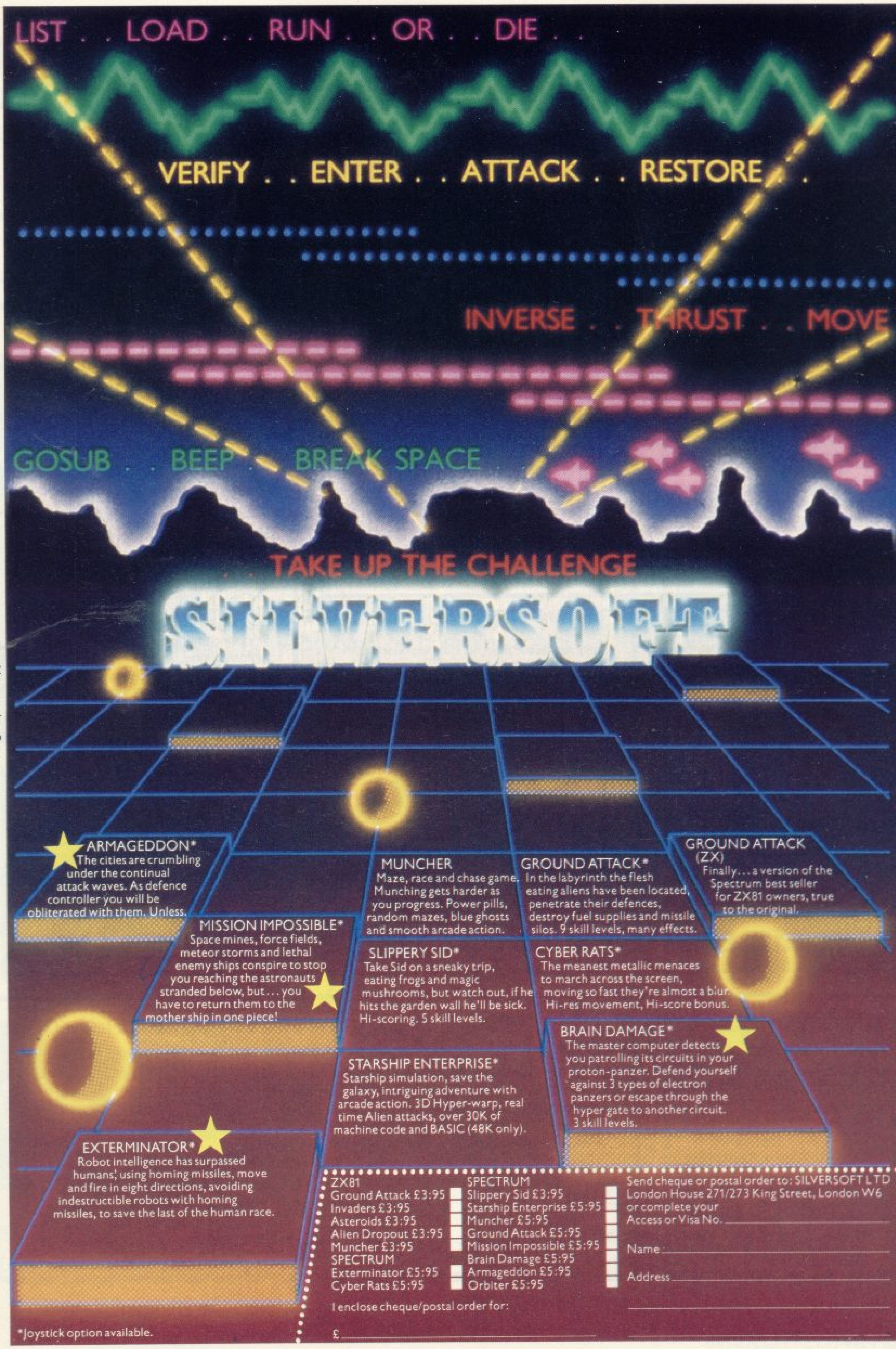
Address ____________

Occupation ____________

SU9

COMPUTER ADD-ONS

7-9 Thane Works, Thane Villas London N7



Design by Tim Epps ©

Discount on games for both machines

WE CONCENTRATE on games for our special offer to club members this month. With a discount of 20 percent there are real savings on cassettes which have proved popular for many months.

There are four games in all, two for the ZX-81 and two for the Spectrum. ZX-81 owners can make savings on the ingenious **3D Monster Maze** from New Generation Software, the first three-dimensional game for any Sinclair computer, and on the Quicksilva **Defenda.**

The Spectrum games are both from the small new software house Quest Micro Software. They are the interesting space adventure games **Black Hole** and **Violent Universe.**

Full details of the games and their usual and offer prices are shown below. Members should avail themselves of the offers in the usual way by sending orders and membership cards to the relevant suppliers.

Quicksilva is at Palmerston Park House, 13 Palmerston Road, Southampton.

New Generation Software is at 16 Brendan Close, Oldland Common, Bristol.

Quest Micro Software is at 119 The Promenade, Cheltenham, Gloucestershire .

As usual, the offer is open only to members of the biggest club in Britain for users of Sinclair machines and will be available until the end of September. To help new members to take immediate advantage of the savings this month, they should include their order with their membership application.

	Usual price	Offer price
ZX-81		
Quicksilva		
Defenda	**£3.95**	**£3.15**
New Generation Software		
3D Monster Maze	**£4.95**	**£3.95**
Spectrum		
Black Hole	**£5.50**	**£4.40**
Violent Universe	**£5.50**	**£4.40**

People join from all over the world

Membership passes 1,000

THE SINCLAIR User Club is continuing to grow steadily. More than 1,000 members have joined although the Club has only been running for less than 10 months.

Club membership started in Britain but soon readers of *Sinclair User* in other countries began to send registration forms. The Club now has members in Zimbabwe, the Netherlands and as far away as India.

Members are quick to accept the offers which are made through the Club pages. More than 30 orders were made for the RD Digital Tracer since it was offered in May. The device was marked down from £49.95 to £45.

The Club offers members a wide variety of good-quality products and in the past it has offered software from Quicksilva, R and R Software, and PSS. Offers have not been limited only to software. Hardware, such as the Hilderbay loading aid, has sold well through the Club.

The telephone helpline is another service which is for all members. If you have a problem with a program or a query about your machine you can use the telephone for a quick answer. The telephone number is included on the Club cassette newsletter which is sent to all members once every two months. It provides programs and information of interest to all Sinclair users.

The Club offers announced this month are open only to members. Those who would like to join can also take advantage of the offers by including orders on the registration form. The offers are available until the end of September.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name . . . .
Address . . . .
. . . .
. . . .
. . . .

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ. Cheques should be made payable to Sinclair User Club.

Sinclair User Club

Britain

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Basildon Microcomputer Club: Roger Sims, Wickford 63032, after 6.30pm. Meetings every other week on Tuesdays from 7.30 to 10pm at Healey Management Services, The Hemmels, Laindon, Essex.

Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.

Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357. Meetings held on second and fourth Wednesday of each month.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham NG16 3BJ.

Edinburgh: Edinburgh Home Computing Club. John Palmer (031 661 3183) or Iain Robertson (031 441 2361).

EZUG-Educational ZX-80–81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other week on Wednesday evenings.

Glasgow ZX-80–81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth Monday of each month.

Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourock, Renfrewshire PA19 1PL (Gourock 39967). Meetings: Every other week on Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, London SW9 6BS.

Liverpool ZX-Computer Centre: Keith Archer, 17 Sweeting Street, Liverpool 2.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Epsom, Surrey KT19 0SY.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10 pm. Further information from R G Martin (0782 62065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 each Monday, 6pm.

Nottingham Microcomputer Club: ZX-80–81 users' group, G F Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield: South Yorkshire Personal Computing Group. Enquiries to R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).

Sittingbourne: Anurag Vidyarth (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

Stratford-on-Avon ZX Users' Group: Chris Parry, 16 Sackville Close, Stratford-on-Avon, Warwickshire.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

West Sussex: Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

ZX Guaranteed: G A Bobker, 29 Chadderton Drive, Unsworthy, Bury, Lancashire. Exchanges information and programs throughout the country.

ZX-80/ZX-81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

Belgium: ASBL BDMA Belgium National Sinclair Club; P Glenisson, Rue De l'Epeestraat, 14, 1200 Bruxelles.

Belgium, France and Luxembourg: Club Sinclair, Raymong Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (322 6537468).

Belgian User Group for Sinclair owners (BUGS); Op de Beeck, Patrick, Drabstraat 144, 2510 Mortsel.

Micro-Europe Club; R Betz, Chemin du Moulin, B1328, Ohain, Belgium. Telephone: CCP 000 0846556–37.

Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22,6524 H.N. Nijmegen; (080 223411).

Germany: ZX-80 Club, a postal club; contact Thomas Jencyzyk. Hameln, Postfach 65 D-3250 Hameln, Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

Italy: Sinclair Club, Vie Molimo Veccho so/F, 40026 Imola, Italy.

Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

Micro-Europe: Belgium or Club Paris-Micro, 19 Rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX-80–81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg.

Johannesburg ZX Users' Club: Lennert E R Fisher, PO Box 61446, Marshallstown, Johannesburg.

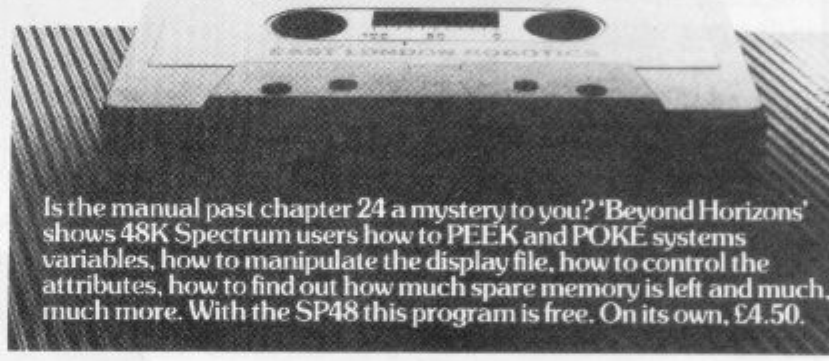
Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.

Swedish ZX-club: Sinclair Datorklubben, Box 1007, S–122, 22 Enskede, Sweden.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).

Extend your 16k Spectrum to 48k for just £23·00. And get a Free program worth £4·50 into the bargain.



SP48, 32K Memory Extension with Program — £23.00

Now, our SP48 offers even better value.

Because now, we're not only offering you the facility to up-grade your 16K Spectrum to 48K, we're also offering you the opportunity to be able to utilise this vastly extended memory quickly and easily.

For £23 all you need to do is plug the chip-set into the sockets provided by Sinclair on your issue 2 (or £35 for issue 1) and you have a standard 48K Spectrum fully compatible with all Sinclair add-ons and very low in power consumption.

There is no soldering required.

Fitting and removal are easy.

And the SP48 carries our full warranty and is upgradable, on a part exchange basis, to SP80.

Then all you need to do is LOAD our specially written 48K guide program, 'Beyond Horizons', and your 48K computer will guide you through its memory.

With no need to labour through manuals.

This will save you time, because we all know how easy it is to get lost with memory maps.

SP80 Paged 64K memory extension — £46

The fitting, power consumption and add-on compatibility are identical to the SP48 (Issue 1 Version £50).

It can be used as a standard 48K, but software instructions can switch to a second page of 32K.

But this is not recommended for the complete beginner.

Yet it is of tremendous benefit to the serious user. And an SP80 FORTH compiler will be available in late September.

For a fit and test service at our premises £3, and by registered post £7.

MAXIMEM ZX81. 32K — £39 (PLUS ONE USED 1K ZX81) 64K — £59 (PLUS ONE USED 1K ZX81)

The MAXIMEM 32 and 64K is a modified ZX81 and not just a RAM pack. It fits inside the case.

We also give a six-month guarantee on the computer, regardless of the age of your trade-in ZX81.

The extra memory uses only a quarter of the power consumption of a 16K plug-in memory, and does not interfere with any standard add-ons, such as printers RS232 or other interfaces.

ZX Slowloader — £10

The ZX Slowloader is a software masterpiece that will help you to LOAD ZX81 programs onto a Spectrum, saving hours of typing time.

The Next Robotics Exclusive. The Trickstick

This new joystick is a revolution in computer games control. With our Trickstick from one to eight players will be able to play simultaneously.

It will be on sale soon — see our next advertisement.

All products on this order form are in stock at the time of going to press. Same day dispatch for phoned Access and Visa orders.

To East London Robotics Ltd: Please send by return (tick items required)

- ☐ MAXIMEM 32K (£39) 64K (£59) + 1kZX81 ____
- ☐ SP48 (Issue 1 £35) (Issue 2 £23) ____
- ☐ SP80 (Issue 1 £50) (Issue 2 £46) ____
- ☐ SLOWLOADER £10 ____
- ☐ "BEYOND HORIZONS" program £4.50 ____
- ☐ Free catalogue (SAE only) ____

Postage 0.65p. I enclose a cheque/PO for ____ My Access/Visa No. is

Name ____

Address ____

East London Robotics Ltd., Gate 11, Royal Albert Dock, London E16.
24 Hour Information Service
Tel: 01-471 3308
24 Hour Access and Visa ordering
Tel: 01-474 4715
Special Enquiries: Tel: 01-474 4430
Telex: 8813271

SU/9/83

EAST LONDON ROBOTICS

Arcades come top in PSS

THE WINNING programs in the PSS programming competition are all arcade games. The competiton was to design a program using the PSS MCoder compiler for the ZX-81 or Spectrum. All the prizes were given for Spectrum programs.

First prize was £500, won by Stan Cartwright of Cardiff. It was for a program called **Elektro Storm.** The second prize of £250 went to Chris Woods of Chessington, Surrey for a program called **Panic.**

The winning program may be marketed by PSS at the end of this year.

Scots get first big exhibition

THE FIRST BIG Scottish microcomputer show is to be held at Brunton Hall, Musselburgh, on Saturday, September 17.

Jill Donnachie, the organiser, says: "The ZX Club has put on a show previously but it was very small. This will feature all the big names.

"We have tried to get as many small computer companies as big ones to take stands. We also have a number of software companies booked and we are looking for more hardware manufacturers to take stands."

The Sinclair User Road Show will be at the show. An advice stand and display of the games from recent issues of *Sinclair User* and *Sinclair Programs* will be there, together with the latest issues of the magazines.

The Sixth Personal Computer World Show is to be held at the Barbican Centre, London from September 28 to October 2.

Some surprises in the Microdrive

THE MICRODRIVE for the Spectrum has finally been introduced, more than a year after it was first announced. The specifications of the final version bear a close resemblance to those given originally with the addition of the interface.

The expansion module is a black sloping box which fits under the Spectrum and can take up to eight drives. It will cost £49.95 but only £29.95 if bought with a microdrive, each of which will cost £49.95. Each of the drives has a capacity for at leaast 85K, so the total on-line memory capacity is approximately 700K.



NIGEL SEARLE "Praying for the success of the Microdrive."

The Microdrives are controlled by an 8K ROM, the software for which was designed by Dr Ian Logan.

As well as giving control over the drives, the ROM will allow an extended command mode which will enable users to add commands to Sinclair Basic. The extra commands would then be available with the rest of the Basic commands when the expansion module is in place.

The 8K ROM will also correct bugs in the Basic and operating system of the Spectrum by over-writing the errors while it is in operation.

The expansion module allows information to be accessed from the tape drives in three seconds. That is slightly better than the original Sinclair specification, which gives 3.5 seconds as the access time for 16K of memory.

At first the company will be offering the Microdrives exclusively through mail order to the first 1,000 people who bought the Spectrum by mail order last year. In that way the company hopes to compensate for the long wait experienced by some of its customers in the past.

It will later be offered to other owners who bought their Spectrums by mail order in strict sequence until that demand had been satisfied. Nigel Searle, managing director, said that he did not know when the drives would go on retail sale as that would depend on the demand and the amount by which production could be increased.

Best in Europe

THE U.K. leads Europe in the sales of microcomputers but West Germany is expected to dominate the market in the next five years. That is the view of the Economic Intelligence Unit, following a review of sales in the major markets of the U.K., Germany and France.

It says the U.K. led by a wide margin in all categories of micros, workstations costing between £3,000 and £10,000, personal computers costing between £500 and £3,000, and home computers costing less than £500 in 1982. It believes, however, that West Germany will soon lead in terms of value, because of the rapid increase in sales of the most expensive workstations.

In 1982, comparative sales showed that sales of workstations in Germany were worth £60.7 million compared to £60 million in Britain and £31 million in France.

The part of the market in which Britain is not threatened is the home computer market. Britain had sales of £94 million last year, going mainly to Sinclair Research, whereas Germany had sales of £28 million.

Learning move

A NEW RANGE of educational software for the Spectrum is to be launched jointly by Sinclair Research and Macmillan, publisher of educational books.

The software will be aimed specifically at the five-to-11-year-old age range and will be the first range of software to be designed for use both in the home and at school.

The programs will be designed for use either on their own or along with the Macmillan publications from which they are derived. The first batch of cassettes will appear in a month and more titles will be added in 1984.

Free aid for programmers

A MARKETING company, Neil Gibson and Co, is prepared to offer free help to microcomputer programmers who are trying to market their products.

John Courage, who owns the company, spoke of what he called "blatant dishonesty" by software houses to programmers who offer programs.

The company initially will deal with software for any Sinclair machine. It will offer programmers free appraisal and suggestions for improving commercial appeal.

When a software package is ready, the company will negotiate on behalf of the authors for the best deal with either a software company or a marketing agency.

Sales boost for old machine

AN ATTEMPT is being made to boost sales of the ZX-81. Sinclair Research is making a special offer through all its retailers selling the machine plus the RAM pack and an item of software for £45.

The company is promoting it as a starter pack, 'ideal for the new user.'

The offer began at the beginning of August. It is to continue for at least two months. Sinclair is also giving away five rolls of printer paper with every printer sold in the period.

It is the latest in a series of price reductions for the ZX-81 since it was introduced at £69.95, plus £29.95 for the RAM pack, in March, 1981.

We have moved

ECC Publications, publisher of *Sinclair User,* has moved. The new address for all correspondence, programs and articles is now 196-200 Balls Road, London N1 4AQ. The telephone number for all departments is 01-359 3535.

Prism leads retail revolution moves

RETAILING of Sinclair software is being revolutionised. Prism Microproducts, a sister company of ECC Publications which publishes *Sinclair User,* has plans for distributing commercial programs which will probably mean the end of mail order for software in the Sinclair market.

It has agreed with the electrical retailer Rumbelows to establish software centres in its shops. It also has plans for a new system of electronic distribution which will be test-marketed in Birmingham in the autumn. The software centres will consist of a shop display which will be serviced by Prism. Regular calls are made by Prism staff to restock the centres and remove software which is moving slowly. The system is intended to reduce the risk for retailers deciding which software to stock.

The national agreement with Rumbelows was signed following a trial in the Home Counties earlier this year. It proved successful and other big retailers are negotiating with Prism to expand the system.

From its base as exclusive distributor in Britain of Sinclair Research products to retailers other than W H Smith, it has built agreements with most of the software houses in Britain.

Electronic distribution plans result from an agreement with Romox, a company based in California. It has developed a system which allows retailers to have a programming terminal at which buyers will be able to record blank cartridges or erased cartridges.

The terminal will be updated constantly with the latest programs by telephone line. Retailers do not have to stock pre-recorded cartridges or cassettes, only blank cartridges.

It is also claimed that the system will permit instant nation-wide distribution with no production delays.

Bob Denton, managing director of Prism, says Romox is a logical extension to its present software merchandising programme and to the Micronet 800 service in which Prism has an interest.

At present Romox is not available for the Spectrum but there are plans to include it if the trials are successful.



Smith cuts ZX-81

W H SMITH, one of the biggest retailers of Sinclair hardware and software, has stopped producing its weekly Top Ten ZX-81 software charts because it does not intend to buy any new lines of software for the £40 machine.

Smiths will continue to sell its present range of software but has discontinued the chart as it feels the sales figures would be unrepresentative of the market.

One reason for not continuing to expand its range of ZX-81 software is growing involvement with the sales of other machines, such as the Oric and BBC microcomputer.

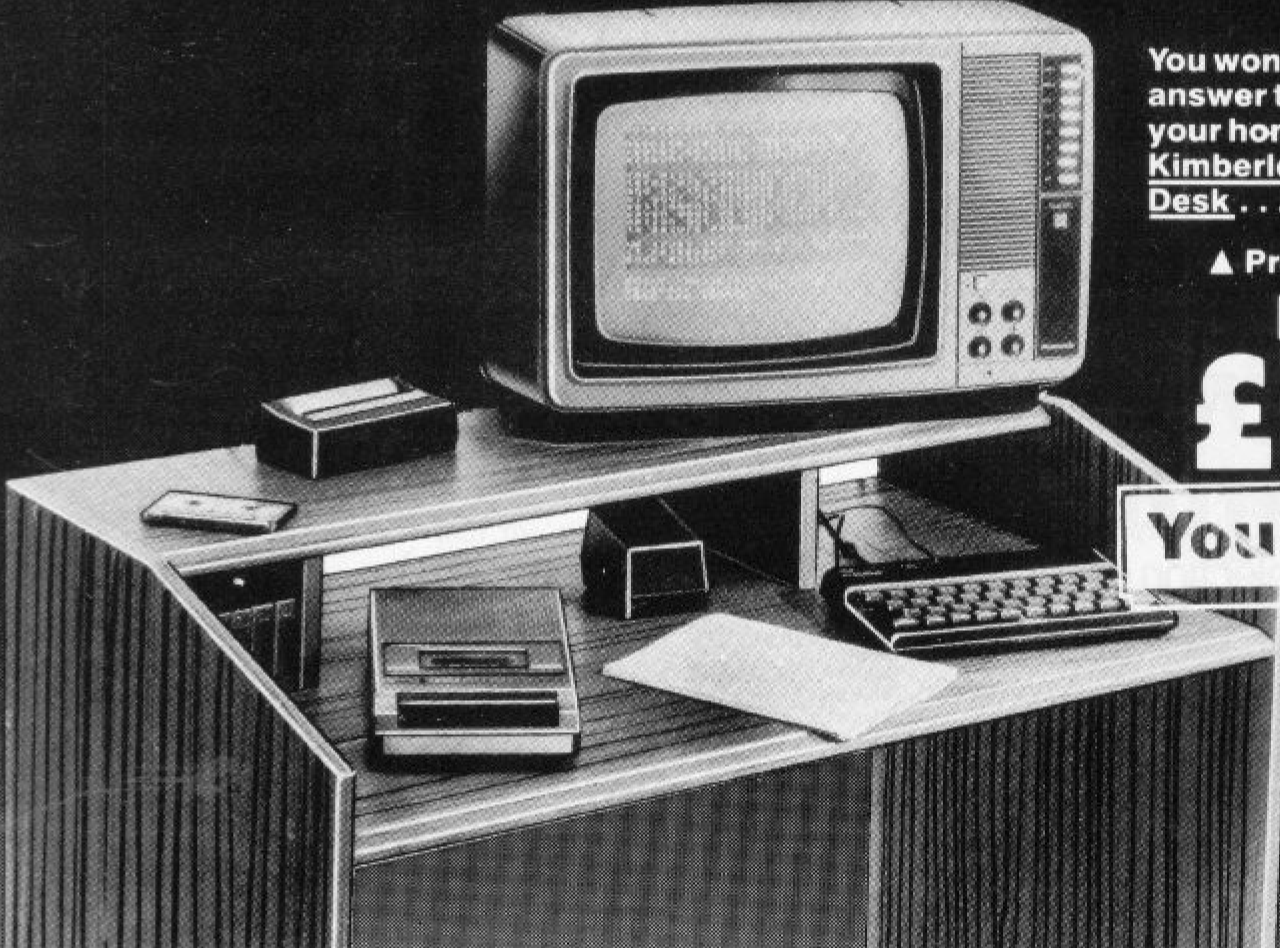
Sinclair User is reviewing the accuracy of the charts produced by various sources and deciding whether to continue with the listings. For the present, however, the magazine will continue to show the Top Ten chart for the Spectrum.

Spectrum Top Ten

Program	Last Month	Company	Memory
1 Penetrator	3	Melbourne House	48K
2 Jet-Pak	2	Ultimate	16K
3 Flight Simulation	1	Psion	48K
4 Hobbit	5	Melbourne House	48K
5 Transylvanian Twr.	4	Shepard	48K
6 3D-Tanx	6	d'KTronics	16K
7 Horace Goes Skiing	8	Psion/Mel.House	16K
8 Ah Diddums	9	Imagine	16K
9 Starship Enterprise	–	Silversoft	48K
10 Test Match	–	Computer Rntls	48K

Compiled by W H Smith

How to make your computer feel at home.



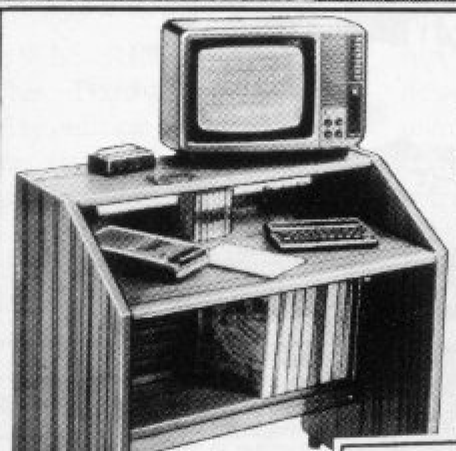
You won't find a lower-cost answer to the problem of housing your home computer than the MFI Kimberley Home Computer Desk . . .

▲ Previous Price ~~£59.95~~

£19.95

You save 66%

Keeps keyboard, cassette recorder and TV in one handy unit. Elegantly styled in teak-effect finish. 31¼" High x 32¾" Wide x 19¾" Deep.



Even more storage space for books and manuals. With castors for extra mobility. In teak-style. 31" High x 32¾" Wide x 19½" Deep.

Sherwood Mobile Computer Desk
▲ Previous Price ~~£74.95~~

£29.95

You save 60%



Fold down desk lid gives extra working space and stows away your equipment when not in use. Extra cupboard with two shelves and smart glass door. In teak-style. Castors too! 34" High x 35" Wide x 19½" Deep.

Carmen Micro Computer Organizer
▲ Previous Price ~~£114.95~~

£44.95

You save 60%

Prices are for self assembly units and do not include computer equipment and accessories. All sizes approx. 'Previous price' charged in our ▲ Wembley Park branch for a minimum of 28 days in the last 6 months. Some items may not be available at smaller stores. Advertisement not applicable in the Republic of Ireland. Prices correct at time of going to press 26.7.83.

A new MFI Home Computer Desk keeps your computer, your home and your budget all in tune.
See them now at your nearest branch.

Phone TELEDATA 01-200 0200 for address of your nearest MFI

Your friends in the furniture business



Dolphin camp confusion

I WRITE with regard to an article in your June edition in which you talk of the holidays organised by Dolphin Activities Ltd as being Dolphin Camps. You will notice that Dolphin Activities Ltd does not use the term Dolphin Camps because that name is applied to some camps which we have organised since 1919.

The Dolphin Camps are canvas camps organised for preparatory schoolboys on the cliff-top at West Runton, Norfolk. In addition, for older children, we organise specialist camps for go-karting, canoeing, sailing.

You will appreciate that the similar names tend to cause some confusion which we are anxious to avoid.

N Taylor,
Walthamstow, E17.

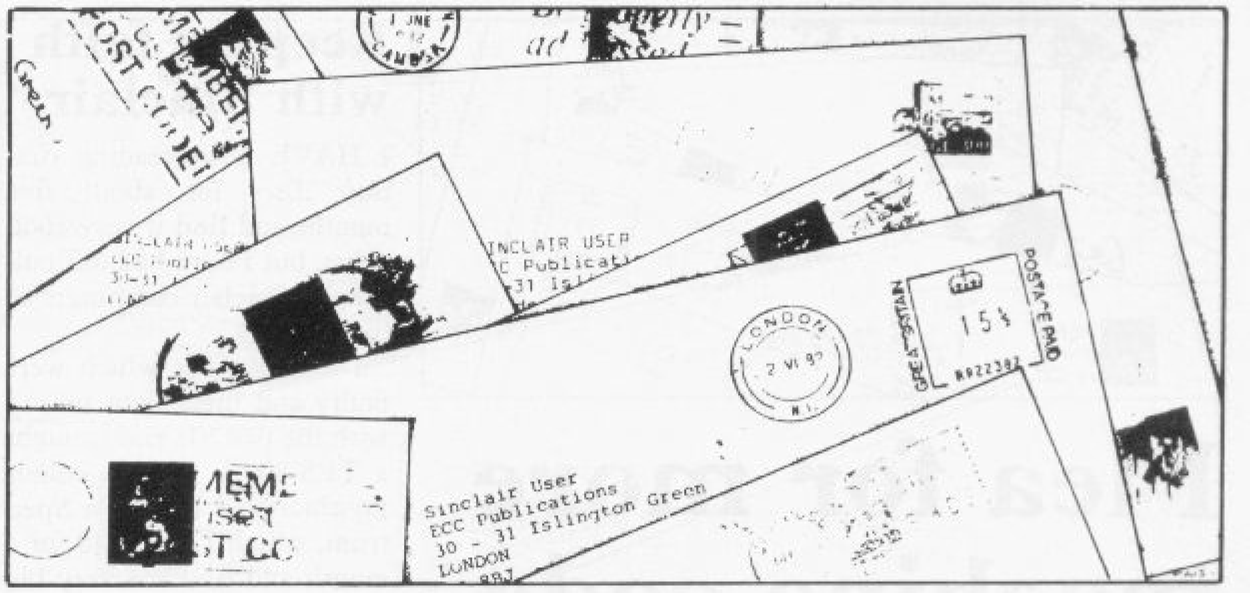
Cheaper file solution

I WAS READING *Sinclair User* Hardware World — May edition — when I saw the article for an improved printer spool.

I believe that I have a much cheaper method of dealing with the problem. A folded piece of printer paper is inserted in the slits in the side of the plastic ends and then wrapped around.

When the end is pushed into the roll of paper it fits much more tightly and seems to eliminate the problem.

Nicholas Atkinson,
Rye, Suffolk.



Unsolicited compliment

MAY I comment on the quality of your magazine? It has improved month by month and I find it an excellent mixture of reviews, comment, news items and advertisements. I look forward to receiving each new edition with increasing interest.

David Brown,
Consett,
Co. Durham.

Simple binary conversion

I HAVE FOUND that among my friends who own Spectrums and also note from many of the programs you publish that many people have difficulty in transposing binary numbers as used in graphics into decimal.

The eight digits can each be allocated a number, thus:

0	0	0	0	0	0	0	0	Binary
128	64	32	16	8	4	2	1	Decimal allocation

If any of the eight digits is expressed as a '1' in the binary number, the number below that digit is taken as the decimal. If more than one box is expressed as a '1', the sum total is the decimal:

0	1	0	1	1	0	0	1	Binary
128	64	32	16	8	4	2	1	Decimal allocation
	↑		↑	↑			↑	

Take the decimal numbers below the '1's which in this example are 64, 16, 8 & 1 and add them together = 89.

B Dickenson,
St Neots, Cambs.

Light work for new input pen

IN YOUR REVIEW of the dK'tronics light pen, to say that the suggested delay routine causes an immediate crash on the 48K Spectrum is a damaging comment and untrue.

Although I have no connection whatever with the company — I am just a well-satisfied customer — I feel compelled to tell you that I have found no difficulty with the delay and to denigrate the excellent device, however slightly, through what must surely have been an error on the part of your reviewer, is unfair.

The delay routine suggested can prove very useful but it is not obligatory. I have written a program for family use which gives two hours' amusement without having to use the Spectrum keyboard, except to enter the number wishing to play, and their names for the scorecards, after loading.

That worked perfectly with the delay routine which your reviewer condemned but I have now abandoned it to speed the action and add another competitive aspect to the game options, all of which, and there are many, are selected by pointing the pen at the appropriate areas on the screen.

Incidentally, I have not written this to sell my program. My efforts in that direction are strictly for home consumption and my own amazement.

I thought it only fair to say that the dK'tronics light pen has added very considerably to the pleasure I derive from my Spectrum and I hope that you will review your review.

Alfred Bone.
Dagenham, Essex.

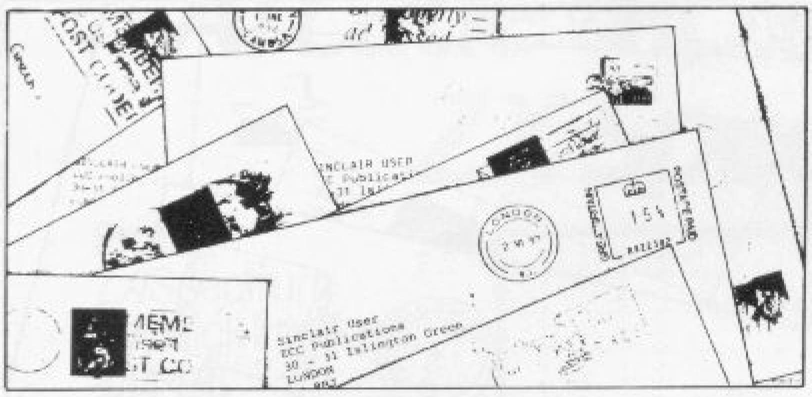
Lower cost of planned cycle

THANK YOU for your review in the July issue. I wrote to you to inform you that we had reduced the price of Cycle Planner/Growth Tracker from £7.25 to £4.95. Unfortunately that was not conveyed in the review which had as one of its criticisms the cost of the cassette.

We had two quarter-page advertisements in *Sinclair User* May/June — and have refunded £2.30 to all mail-order customers after May 25.

Medidata,
London NW9.

more Letters p.20



Plea for more machine code

HAVING RECENTLY bought a Spectrum, I have re-started the quest for machine code programming, having already broken through on the ZX-81. I can say now that I am fairly proficient at it but I wish to make a complaint.

You have not yet in any *Sinclair User* issue made more than a passing reference to Spectrum MC and little more in the case of the '81. Machine code programming is not really so difficult if you try and it is most satisfying. I am sure it would become much more commonplace if you printed articles on MC programming techniques and advice, and fewer articles in the vein of User of the Month and fewer large, spacious illustrations and pictures.

Further, what about giving Andrew Hewson more pages? He is often helpful and is to be encouraged.

Finally, I 'am glad to see that you often review current software, as an unbiased opinion is often a good guideline on a certain tape. In the one tape I have bought which you had reviewed, however, I was misled by you. The game, Winged Avenger by Work Force was, you said, difficult. That is rubbish. When my sister, aged 11, and I play it, the only limiting factor to a high score is how many hours we have to spare to play. It is undoubtedly the worst Spectrum game I have seen, so please review games critically.

J H Fletcher,
Wirral,
Merseyside.

● *We are looking at a series on machine code programming on the Spectrum but will not be printing it at the expense of more general articles, such as User of the Month. Our readers have a wide range of interests and we shall attempt to continue to cater for all of them.*

While one person's criticism is another's flattery, we always try to give readers a good idea of what to expect from the software on the market and will not be afraid to make critical remarks where they appear justified.

Disc limits warning

I BOUGHT a copy of Pete Shelley's cassette XL 1. I had problems loading the cassette into my Spectrum, so returned the cassette to the record shop, which exchanged it for another copy. That copy would not load.

I telephoned the record company, which told me that the cassette is only for the 48K Spectrum. Nowhere on the cassette or the packaging did it say so. I would like to warn other 16K Spectrum owners to prevent them buying the cassette hoping to load it into 16K Spectrums.

Bryan Griffiths,
Luton, Beds.

Keeping faith with Sinclair

I HAVE been reading *Sinclair User* for about five months and find it very good value, but I have had difficulty with Sinclair computers in the past.

I had two 81s which were faulty and then I got fed up with the two 81s and brought a TRS-80. It had no colour graphics so I bought a Spectrum, which I have had for a month and find it a very big improvement on the ZX-81. Keep up the good work.

R Cordes,
Sittingbourne,
Kent.

Randomized screech

WHILE I was experimenting with the command RANDOMIZER USR on my 16K Spectrum I discovered that by typing-in RAND USR 1331 a magenta and blue-striped border was produced and a screeching sound was emitted from the computer. That can be stopped by pressing SPACE.

That strange bug, if it can be called that, can easily be accommodated in games, as it apparently has no effect on a program.

Does anyone know why it does it or how it does it? Also does anyone know a method of getting rid of the aggravating Spectrum buzz?

I would like to conclude by pointing-out a bug in Andrew Hewson's decimal loader on page 102 of the June *Sinclair User*. Surely line 60 should read GOTO 20 or the numbers are poked into the same address each time?

Aidan Taylor,
Loddon, Norfolk.

Portable computers

IF ANY READERS are looking for a cheap, strong carrying case for a small computer, could I recommend the Gear Box from British Home Stores? It is a strong plastic lunch box 36×28×12cm. and holds my Spectrum, all leads, a small tape recorder and a few tapes and books. I have lined it with thin foam. It does the job well and costs only £4.50.

Many thanks for an excellent magazine. My only complaint is what happened to the regular education slot?

Elizabeth Atherton,
Chester.

Extra resistor causes problems

LIKE ALL apparently simple solutions to the problem of ZX-81 over-heating, W D Langton's ideas of a 5ohm resistor in the power supply lead is likely to lead to additional problems which could be even worse than over-heating.

My ZX-81 with 16K memory draws, on average, 700ma and when the printer is working at full stretch it rises to 1,100ma. Now 700ma will cause a voltage drop of 3.5V, and 1,100ma a drop of 5.5V across the 5ohm resistor. That means that the original 10.5V — 10.75V on my Sinclair power pack — will drop to either 7.25V, or 5.25V if the printer is 'flat out'.

In addition, the value of the smoothing capacitors on the Sinclair power supply means that a ripple voltage of 2.2V at 700ma, and 3.4V at 1,100ma, is present. When the ripple voltage is subtracted from the voltage with the 5ohm resistor in circuit, it does not take much imagination to realise what can happen, as the ICs in the ZX-81 require a 5V supply. Hence the reason for the 5V regulator in the ZX-81.

There is a minimum volt-

age drop across the regulator which will not work properly unless the voltage to the regulator is at least 7V.

Practical consequences can be white-outs, crashes, printer malfunction — just name it, you have it.

The only really satisfactory solution is a regulated power supply of about 7.5V, which will cure all problems.

If a simple compromise 'cure' is sought, it is well worthwhile inserting four silicon rectifier diodes of 2-amp rating into the supply lead instead of the suggested resistor; doing so will give a voltage drop of about 2V irrespective of the current drawn by the ZX-81, which is not the case should a resistor be used.

Another improvement would be to increase the value of the smoothing capacitors by 2000MFD. The ripple voltage on the supply line would then, at worst, be 2V instead of 3.4V.

Although not perfect, the result would be that the ZX-81 ran much cooler and any other problems would not be precipitated, or made any worse than before the modifications.

Charles Rowbotham, Carnforth, Lancs.

Is this a new record?

I HAVE just saved Bill the Worm from the ninth level in Mind Out for the 48K Spectrum. My score was 7,400; is that a record?

I have also scored 82,812 on the Silver Soft Cyber Rats and 153,350 on Artic 1 Galaxians. Why not print a league table of high scores every month?

Graham Lawrence, Maidenhead, Berkshire.

Expanding factorials

THERE ARE various programs for calculating permutations and combinations. They always have limitations because they necessitate, somehow or other, calculating the factorials of various numbers; the factorial of a number, of course, being 1×2×3×4 . . . up to and including the number. Calculated that way, the biggest factorial which can be computed on a Spectrum is 34.

With a little improvisation, the range can be extended considerably, by using the logarithm key:

```
5 REM LARGE FACTORIALS
10 PRINT "FACTORIAL NEEDED?":INPUT X: PRINT X
20 LET A=LN 1
30 FOR B=1 TO X
40 LET C=LN B
50 LET A=A+C
60 NEXT B
70 LET D=A/ LN 10
80 LET E=D-INT D
90 PRINT "FACTORIAL OF X;X;" IS "; 10↑E; "TIMES TEN TO THE POWER"; INT D
```

I have not discovered the limits of the program. I have established that the factorial of 2,000 is 3.3163794 times 10 to the power 5735. It must be said that my Spectrum is a little costive in yielding results at this level and patience is called for.

Rev H S Corran, Shankhill, Co Dublin.

Large demand at low price

IN THE JULY ISSUE, Early end for the ZX-81? you write that in your opinion there is probably a base price for computers of about £30 and also that a fall in prices would mean the early end of sales of the ZX-81.

In my school, and I am sure the same could be said for most schools, the only opportunity many children have for devising their programs is when they have the chance of time with one of the school machines. They would dearly love to have their own machines but their parents cannot afford the £40 for even a ZX-81.

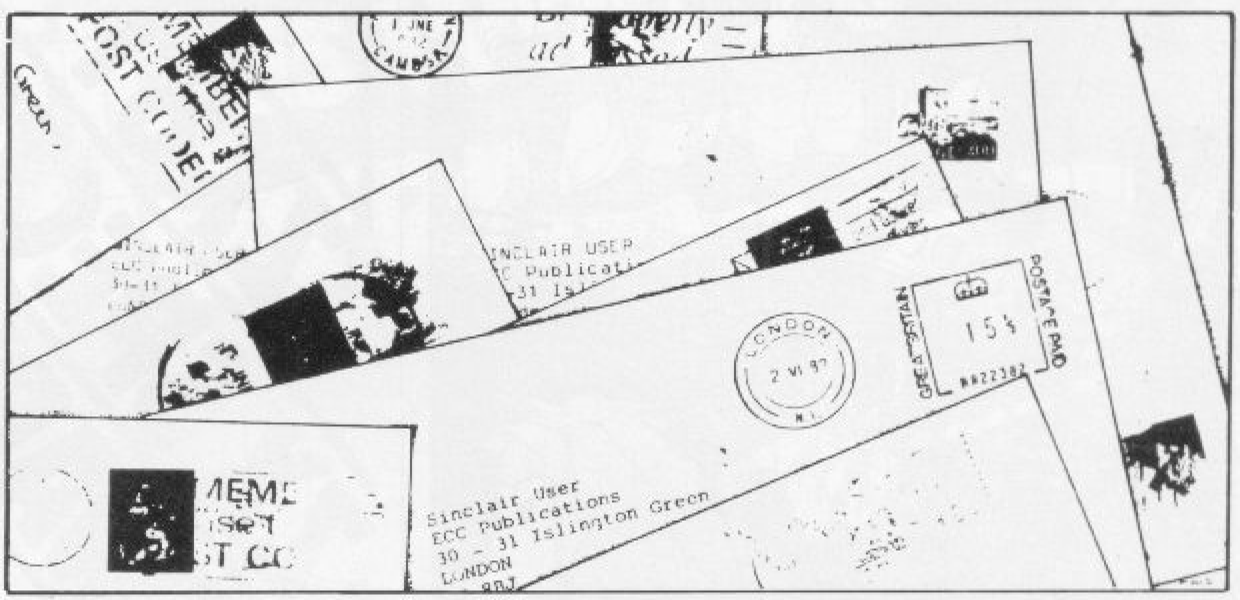
If the basic price of a ZX-81 fell to £30 or even lower, many parents would not only be able but also keener to buy. If a child did not sustain interest, the amount spent would not be too great; if interest was sustained it would be money well spent. Further opportunities — birthdays and Christmas — would provide extras or even a trade-in for something better.

D Gilbert, William Bellamy Junior School, Barking, Essex.

Club call in Tameside

I WOULD like to start a Sinclair computer club in the Tameside, Lancs area but first need to find if sufficient people would be interested.

Jacqueline Wright, 17 Crawford Terrace, Ashton-under-Lyne, Lancashire.



Making notes while listing

THERE ARE two small improvements I think you could make to *Sinclair User* — the addition of small notes under the program listings illustrating how programs can be converted from the Spectrum to the ZX-81 or vice versa; and how about reviewing the software produced by smaller firms such as the ones which advertise in the Supermart.

Apart from that, does anybody know of a Basic statement which will read what is typed-in and give X that value, replacing the lengthy "IF INKEY$="2" THEN LET X=2" statements?

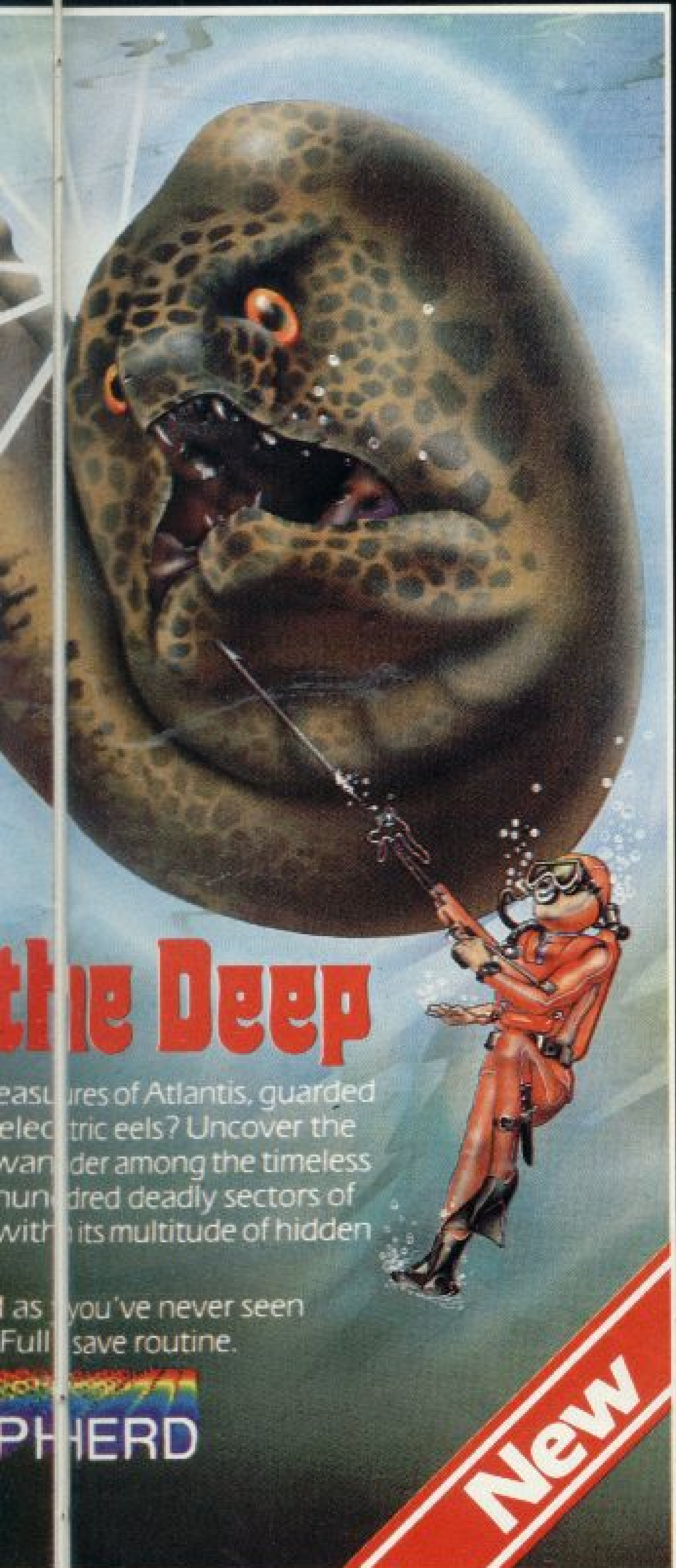
Alistair Hodgett (13), Cheshire.

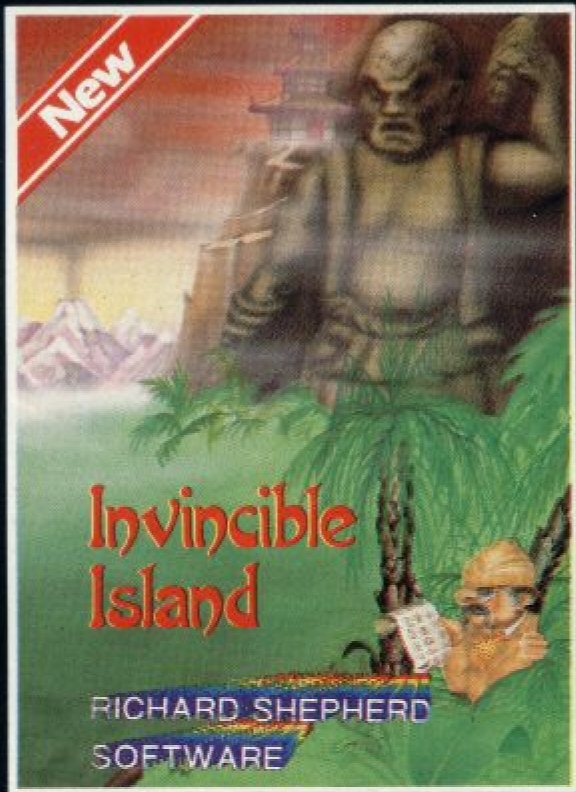
● *Thank you for your tips, which we are considering. In our reviews we make no distinction between large and small companies. Because most companies advertising in Supermart tend to be small, new producers, there is not always time to review their products at the time they advertise.*


explore the mysterious world of Artic Adventures
artic Computing Ltd
NEW
E The Golden Apple
48K Spectrum
You must set out on a quest to find the 'Golden Apple'. On your journey you will pass through mansions, travel overseas and onto an island, hunting your treasure.
ZX Spectrum Adventures £6.95
ZX 81 Adventures £5.95
All these games are instant-response machine code programs. Adventures B, C and D include cassette save routines.
Artic Computing Ltd.
Main Street, Brandesburton,
Driffield YO25 8RG.
10% Discount for 2 and 15% for 3 or more.
Cheques and P.O.'s made payable to Artic Computing Ltd.
Dealer enquiries welcome.
Please state whether your order is for ZX81 or SPECTRUM.
Access and Barclaycard welcome.
Send S.A.E. (9 in × 6 in) for FREE catalogue of our wide range of programs
A
ANOTHER GREAT ADVENTURE GAME FOR THE 16K ZX81
PLANET OF DEATH
B
ANOTHER GREAT ADVENTURE GAME FOR THE 48K SPECTRUM
inca curse
C
ANOTHER GREAT ADVENTURE GAME FOR THE 16K ZX81
SHIP OF DOOM
D
ANOTHER GREAT ADVENTURE GAME FOR THE 48K SPECTRUM
ESPIONAGE ISLAND
16/48K ZX/Spectrum
16K ZX81
You find yourself stranded on a strange alien planet. Your aim is to escape by finding your captured space craft. But beware of the little green man who may get to you!
48K Spectrum
16K ZX81
You are in the middle of a South American jungle when you stumble across a strange Inca temple. Enter it to collect treasure and then try to return. But beware don't let greed be your downfall.
48K Spectrum
16K ZX81
While on a reconnaisance mission you are drawn to an alien cruiser on a humanoid slave mission. Try to escape from aggressive aliens, luscious androids and drunken barmen. Your only help is Fred the friendly android.
48K Spectrum
16K ZX81
You have to survive an engine failure while flying over an apparently uninhabitated island in the South Atlantic. Use your wits to harass the enemy, but treat the beautiful native women with respect, to escape from the island and return to an allies aircraft carrier.
VISA
ARTIC COMPUTING LTD.
Main Street, Brandesburton,
Driffield YO25 8RG.
ARTIC
Please rush me:
*Adventure A☐ B☐ C☐ D☐ E☐
*for my ZX81 £5.95 /SPECTRUM £6.95
I enclose a cheque for £
or debit my Barclaycard/Access account
NAME
ADDRESS
*Tick, delete or complete as applicable.
WARNING: These programs are sold according to ARTIC COMPUTING LTD's terms of trade and conditions of sale. Copies of which are available on request.

"…TO IMAGINATION"

…MITH, JOHN MENZIES, BOOTS*
…G COMPUTER STORES

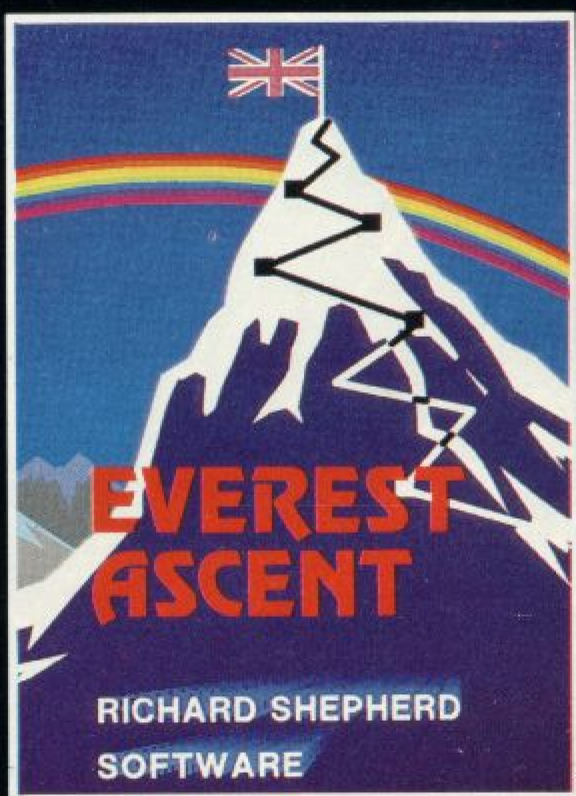




Invincible Island
by Peter Cooke

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location. Save routine. 48K Spectrum **£6.50.**



Everest Ascent

Stake your claim to the top of the world in this strategic vertical adventure. Conquer the summit of the world's highest peak! . . . struggle from base camp to base camp . . . survive the elements . . . watch out for avalanches, thin ice and wayward sherpas . . . encounter abominable snowmen and cross bottomless crevasses!

A game of skill, strategy and planning — a graphic simulation of man's ultimate endeavour! Save routine. 48K Spectrum **£6.50.**

…NTACT JOHN SALTHOUSE ON (06286) 63531 FOR DETAILS

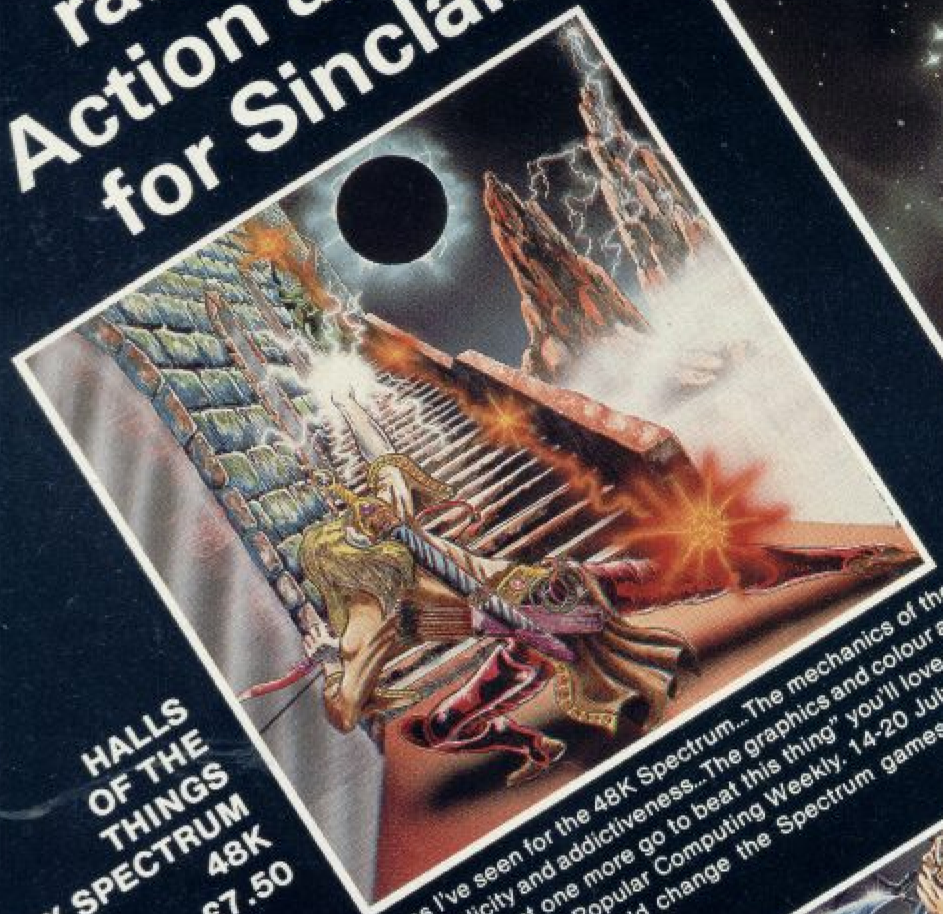
…CARD HOTLINE
…0628 6) 63531
…PRESS SERVICE

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

* Selected titles available at larger branches









Stylish keyboard

STEATITE Insulations has produced one of the most stylish keyboards yet for the ZX-81. It has a sloped front and 40 push-button keys. The keys are labelled just like the ZX-81 with keywords printed on the case. The ZX-81 will not at present fit inside the keyboard; its steel base provides no room to fit it but Steatite plans to change that. The ZX-81 connections are made by soldering two cable strips under the keyboard sockets after pushing them through the hole above the ZX-81 keyboard.

The instructions are clear and simple and the keys a pleasure to use. The only problem seems to be dished tops of the keys which are a little difficult to insert. Steatite says that it wants to improve the keyboard as much as possible.

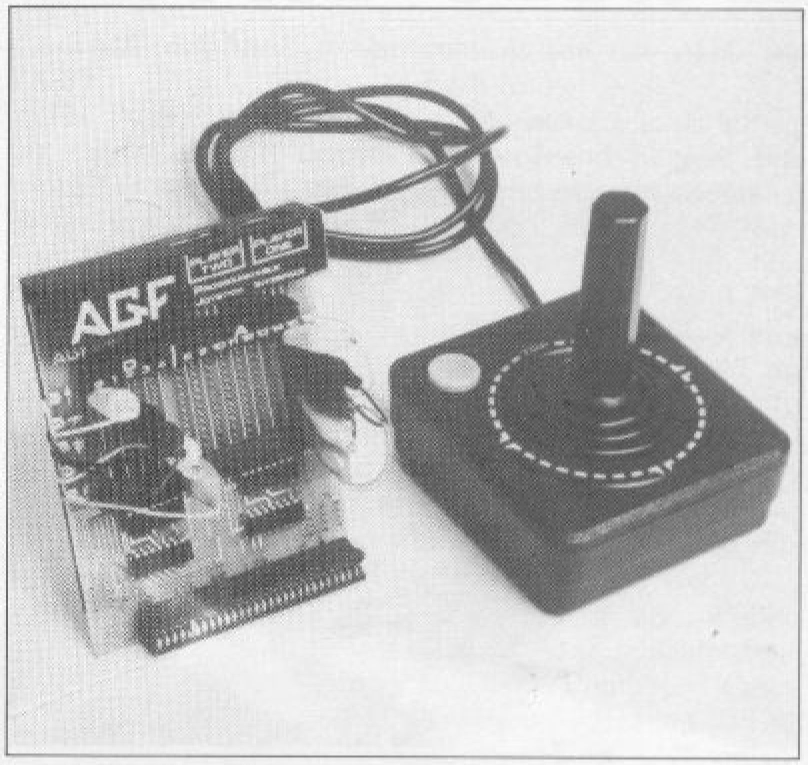
Contact Steatite Insulations Ltd, Hagley House, Hagley Road, Birmingham B16 8QW. Tel: 021-454 8661 for the keyboard, which costs £30.95 inc. VAT and postage.

RAMpack grip

IN THE JULY issue a review of ZX-81 RAM packs omitted the name and address of Audio Computers. It has now sent a newer version of its RAM pack which it has been selling for the last three months. It is much better than the one tested previously as the edge connector is different—it is now black with a tinned spring instead of gold-plated—and has longer feet to take it up to the correct height. The RAM pack grips with a ridge of plastic on top of the ZX-81.

Audio Computers is at 87 Bournemouth Park Road, Southend-on-Sea, Essex. Tel: 0702 613081. The price of the 16K RAM pack is £19.95 plus £1 postage and packing.

Universal joystick produced by AGF



AGF has produced a programmable version of its joystick board which works on either the ZX-81 or the Spectrum. There are two joystick sockets for standard Atari-type joysticks but they both operate the same keys. There is no longer a need for a specially-modified joystick. The programming is done for each of the five positions of <, >, :, /, and FIRE button by two crocodile clips for each of the positions.

One clip selects one of five 'D' bars and the other one of the 'A' bars. Thus any of the keys on the 40-key keyboard can be simulated by various combinations of the two clips.

A chart is given on the back of the joystick giving the 'D' and 'A' numbers for the various keys.

It would have been far easier to use if it had been set out like the keyboard in a 10 by 4 line matrix instead of an 8 by 5 matrix. It would also have been useful to see that or a picture of the keyboard showing the relative 'A' and 'D' lines in the instructions.

Ten programming cards allow the user to mark the position of the clips for various games, so reference to the instructions is not required every time. Extra packs of 10 can be purchased for £1.

The board has an extension piece on the back for any other add-ons and is easy to use.

One difficulty might occur for people who have fitted a ZX-81 or Spectrum into a case; the crocodile clips may not fit between the case and the board which is tight against the back of the computer. The board should be very popular with games users as it means that any software can be converted to use joysticks without special tapes or joystick-adapted programs. It cannot be out-dated as all games have to be designed to use the keyboard.

The joystick board costs £33.95 and includes a demonstration tape. Joysticks cost £7.54 from AGF Hardware, Freepost, Bognor Regis, West Sussex PO22 9BR.

Sturdy stand limits growth

COMPUTERLOCK produces a large black tray and stand for the ZX-81 or Spectrum which tidies all the wiring for a computer. You can stand a TV set on top of the stand, which is about 9in. high, to provide a better view. The tray is large—25×17½in. with a 1in. wide ridge all the way round. The TV stand should support the weight of most TVs and the model tested had the two extra mains switches fitted. They are optional extras at £3 each but you will have to wire them to the mains yourself. If you are unsure you can ask an electrician to wire it from the diagram provided.

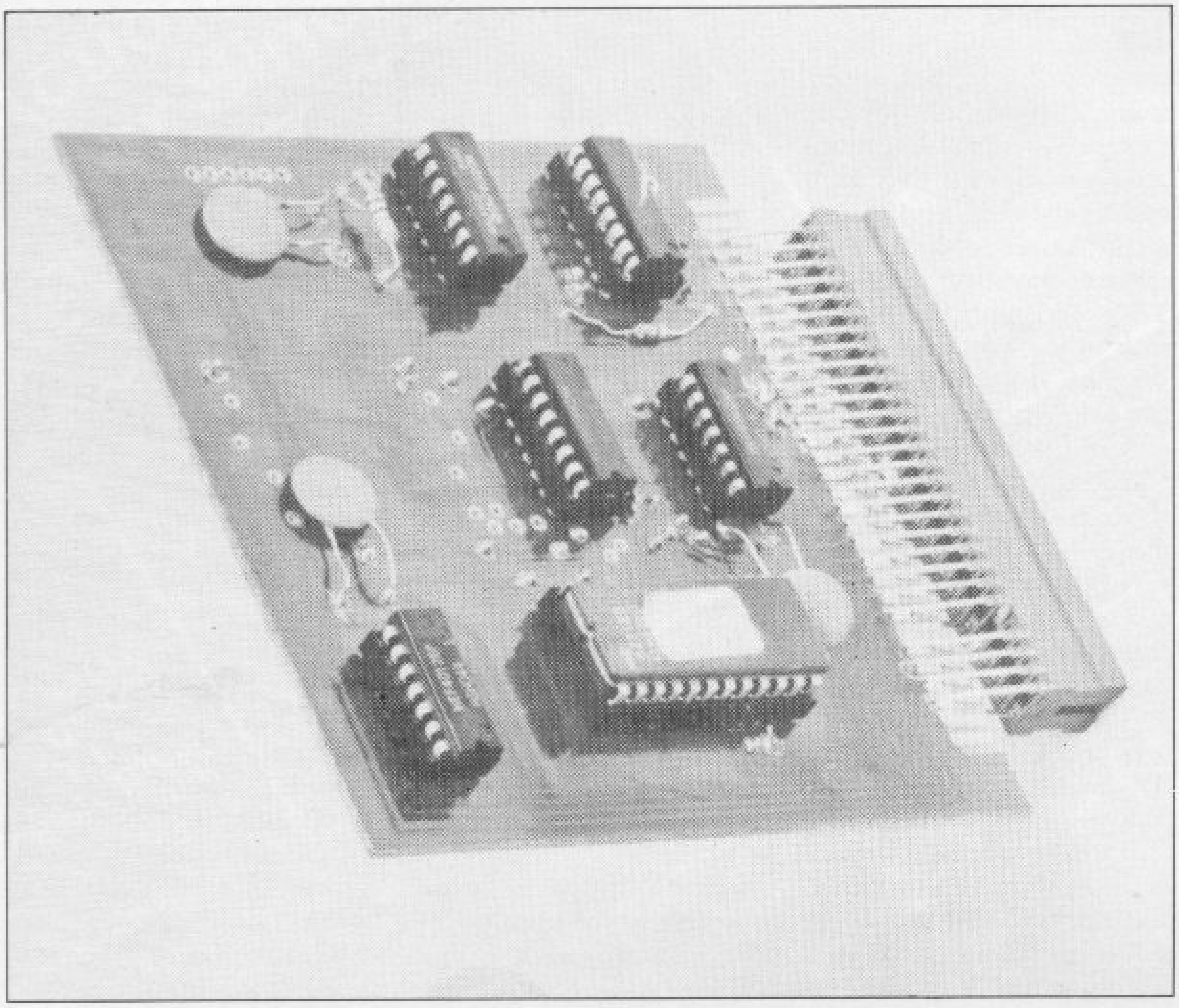
A hole in the front of the stand permits access to the keyboard but the remainder of the wiring is hidden.

The cassette leads can be taken out of the side of the stand at the left but they will be near the mains leads, as that is the only exit. It will not be possible to use the Sinclair printer as it will be under the stand, as well as any Microdrives.

Altogether a sturdy package but it would be difficult to use if you intend to add anything on the back of the computer which requires access during programming. The Computerlock console costs £31.50 and is suitable for the ZX-81 or the Spectrum. Computerlock, 2 Wychperry Road, Haywoods Heath, West Sussex RH16 1HJ. Tel: 0444 451986.

More Hardware World.

EPROM boosts Basic facilities



ORME ELECTRONICS Eprom Read card for the 16K and 48K Spectrum fits into the ROM space which is unused at present and can provide more facilities for Basic programs. With the EPROM I fitted, 10 extra routines are added for program editing, such as block delete of any section of program, re-numbering, variables dump. Commands which can be used in programs include left and right scrolls of the screen, TEXT justifier—to the printer only— and a very good sprite routine which will allow you to print various-sized characters at any location on the screen.

It will also allow you to turn round the characters by 90 degrees and print them in inverse and/or over other characters. There is also an extra graphics set which can be called-up from the ROM into the user-definable graphics area.

Each of the routines is used by giving a RANDOMISE USR—variable—command. An OUT command must also be used to change to a different section of routines as only 1K of the ROM is available at a time. The first routine is called by a number every time the program is RUN and that sets up the variable names to be used in the rest of the program. So, for instance, RANDOMISE USR REN would renumber all the lines in increments of 10 from 10.

The routines are easy to use if the examples are followed to the letter. VRD—variable dump—works only on variables created after the variable set-up routine and deletion of lines works only with lower-case REM del statements.

Prices update

The EPROM board for use with motherboards costs £18.50 and the direct connecting type £21.25. Tape control costs £3.45 extra, as does EPROM I at £9.95. Postage and packing costs 75 pence for the U.K. and £1.75 overseas. Orme Electronics, 2 Barripper Road, Camborne, Cornwall TR14 7QN. Tel: 0209-715034.

IN THE AUGUST issue in Hardware World, we gave the price of the Tactile keyboard as £99.95. It should have been £9.95, with the price of the demonstration tape as £5.95 and not £92.95.

We also said that the Jiles tape copier cost £99.95. It should be £9.95.

Database interface opens new world to users

COBRA has been advertising its RS232 interface for the ZX-81 for some time. Its TMS terminal package consists of a tape and a black box which fits on to the rear of the ZX-81. Out of the black box emerges a single grey lead containing three wires, one 0V, one red output wire and one blue input wire. The wires need to be connected to a modem and a 300 baud acoustic modem was used to try the TMS pack with Telecom Gold.

Once the interface and a 16K or bigger RAM pack is plugged into the back of the ZX-81 the power can be turned on and the TMS tape LOADed. Telecom Gold service was dialled to gain access to a private database run by Cobra.

The TMS program must first be set up for the correct speed, number of bits sent by the use of a very good menu which allows you to select only one character option for each instruction. Cursor controls are provided to move from one instruction to the next.

If a selection is incorrect the program will not leave the menu when pressing NEWLINE and will place an asterisk over the mistake.

Among the options of the program are the ability to send control characters—for special options—upper- and lower-case, even though the ZX-81 will display only upper-case—and obtain a hard copy of the result on the Sinclair printer.

Once on the Cobra database you have a choice of playing games, sending messages to another user via the

continued on next page

continued from previous page

Mail Box facility or talking directly to another user as well as using Telecom Gold facilities. All the facilities and access have to be paid for. Cobra hopes to set up, with British Telecom, a network of home users to take advantage of the system.

Having an RS232 does not restrict you to using Telecom Gold; it can be used on most databases or bulletin boards—like electronic newspapers run by user groups.

The system works well within the limits of the ZX-81 but a few limitations were noticed—not due to the interface. One was the ZX-81 keyboard which made reliable communication difficult and the other was the telephone line. The system used depends on the distant computer sending back your message for you to see—called full duplex—and the message can be garbled both ways, leaving you unsure whether it was due to your mistake or that of the system. That was due mainly to line noise.

The TNS package costs £71 from Cobra Technology Ltd, 378 Caledonian Road, London N1 1DY.

Another solution to RAM pack wobble

KELWOOD COMPUTER cases has two computer stands—the Wobble Stopper for the ZX-81 and the Power Base which has versions for both the ZX-81 and Spectrum.

The Wobble Stopper is in three versions—small, tilted and large, for use with the Sinclair printers. Tilted versions are available in small and large sizes. All versions have a white nylon screw at the back which is tightened to prevent the wobble, clamping the RAM pack firmly to the ZX-81.

The Power Base is a sloping stand of about 15 degrees which has two rocker switches mounted on the sides. The right-hand side switch controls the power to the computer and can be used as a RESET switch. The power plug from the power pack is plugged into the back of the stand and the computer obtains its power from a lead which is terminated inside the stand. The other switch controls the two MIC and EAR leads.



The cassette leads are intercepted and plugged into the stand from the computer; two 12in. long cassette leads are then plugged into the tape recorder from the stand. The front of the Power Base has a turned-up edge to hold the computer firmly. The only screws are for getting into the base and to hold the rocker switches and power socket to the case. They are also supplied with rubber feet.

Power Base and Wobble Stopper are available from Kelwood Computer Cases, Kelwood Heating Ltd, Downs Row, Moorgate, Rotherham S60 2HD. Tel: 0709 63242. The cost of the ZX-81 stand is £5.25 for the small and £5.75 for the large; tilted types cost £1 extra. Power Bases cost £13.50 for the Spectrum and £13 for the ZX-81, inc. VAT and postage.

Permanent storage

EPROM SERVICES has a range of EPROMs available for the ZX-81. EPROM I contains 10 small routines for program editing such as block line delete, delete up/down from line x, re-numbering—only the line number, no GOTOs or GOSUBs—and various checks on memory such as program length.

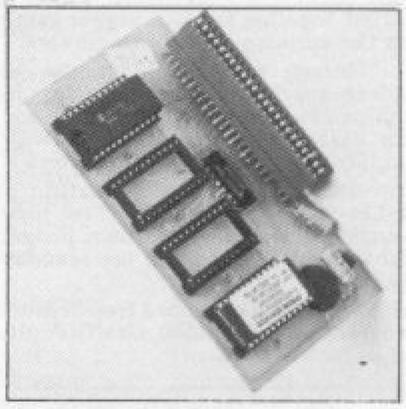
The next 12 routines are for entering machine code into REM statements, in HEX only, and extending and modifying both the machine code and the REM statement. There is also a very useful hex dump facility to view an area of memory which gives eight columns of hex addresses and the data in them on the screen.

Sixteen more routines contained in the EPROM I deal with the screen display and, together with a 6116-type 2K RAM chip at addresses 14K–16K on the same board, allow you to store machine code or TV screens in the RAM. That data is thus protected from a Basic program and can be recalled at any time. That makes a total of 38 routines in one ROM, a real achievement.

EPROM II concerns tape routines for a rapid SAVE and LOAD. EPROM IV contain a very good ZX-81 monitor program. It requires that the board be fitted with the same 2K RAM as with EPROM I to store the monitor screen and separate machine code stack. All the system variables are saved on entering the monitor and all the various Z-80A registers can be set before entering a machine code routine.

Two more useful instructions include ZX-81 versions of the IN and OUT instructions on the Spectrum for transferring data to I/O ports. Machine code can be SAVEd and LOADed from the monitor under the name 'M'. The monitor will work on the minimum 1K RAM ZX-81 and does not require a 16K RAM pack.

Breakpoints and the dumping of the Z-80A internal registers is done into the 2K RAM so that a system crash does not result in the loss of



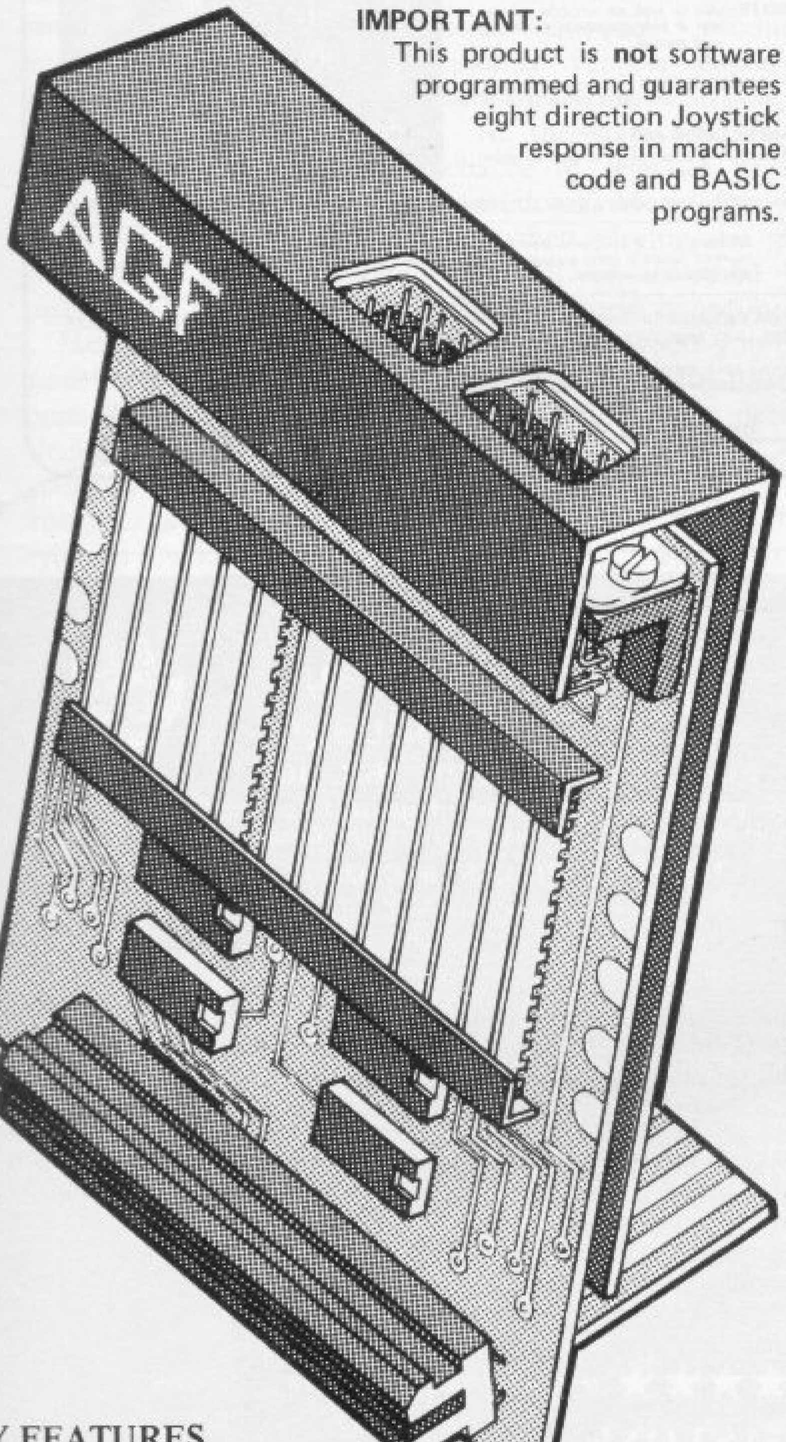
code; a re-set key must be used and the power plug left in.

The EPROM board plus EPROM I is sold for £20 including VAT and postage. Additional EPROMs II to IV cost £10 each and the 6116 RAM costs £6. Eprom Services is at 3 Wedgewood Drive, Leeds LS8 1EF. Tel: 0532-667183. It also does development work and EPROM copying/programming.

TIBILITY CASSETTES 1 & 2, CONVERTING 12 TOP
FOR USE WITH SPECTRUM INTERFACE I AND II

BLE
CE
31
RE
!

IMPORTANT:
This product is **not** software programmed and guarantees eight direction Joystick response in machine code and BASIC programs.



KEY FEATURES

- Any five key configuration programmed onto joystick
- Accepts all Atari-compatible Joysticks
- Rear connector for any other add-ons
- Use will not affect Sinclair guarantee
- Full instructions & 12 month guarantee

JOYSTICK INTERFACE II for Spectrum or ZX81



KEY FEATURES

★ Proven cursor key simulation for maximum software support
★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick, etc.
★ Second Joystick facility
★ Eight directions programmed in simple BASIC
★ Rear extension connector for all other add-ons
★ Free demo program, 'Video Graffiti' + full instructions

JOYSTICKS
ATARI CONTROLLERS
FOR USE WITH OUR INTERFACE Module II or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800
If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks
ONLY £7.54 inc VAT + P&P

INTERFACE II COMPATIBLE SOFTWARE

ZX SPECTRUM		**Hewson ...**	Nightflite
Abbex ...	* Spookyman	**Consultants**	Specvaders
	* Invasion		Mazechase
	* Harrier	**ICL ...**	Star Trail
	* Cosmos		(Man.Dock)
	* The Android Run	**Imagine ...**	Zzoom
	* High Noon	**Micromania**	Ghost's Revenge
	* ETX	**New Gener-**	☐ Escape £4.95
Abersoft ...	Mazeman	**ation**	☐ 3D Tunnel £5.95
	The Wizards	**Software**	☐ Knot in 3D £5.95
	Warriors	**Newsoft ...**	Time Bandits
Apocolypse		**Products**	Spectral Maze
Software ...	Galactic Jailbreak	**Psion ...**	Flight Simulation
Axis ...	Labyrinth		VU–3D
Blaby Comp.		**Quicksilva**	Meteor Storm
& Vid. ...	Chopper Rescue		Space Intruders
	Gold Digger	**R + R ...**	Gnasher
	Confusion	**Software**	Spectapede
Campbell		**Silversoft ...**	Ground Attack
Systems ...	Gulpman		☐ Cyber Rats £5.95
CDS Micro		**Vectis ...**	Pony Express
Systems ...	Leapfrog	**Software**	Vec-Man
C.Tech ...	Specman		**LATEST ADDITION**
DJL Software	Froggy		**Digital Integration ....**
DK 'Tronics ☐	3D Tanx £4.95		Night Gunner & Fighter Pilot
	Meteoroids		

** State "AGF version"* — *"PLUS 21 ZX81 Titles"*

We are pleased to say that future software support commitment for the AGF Interface II has been negotiated from many of the companies listed above.

For example all new titles from Imagine, commencing with Zzoom, will be compatible and carry the compatibility logo, shown below, on their packaging. This new logo scheme will help you select software that is guaranteed compatible and is also being adopted by many of the supporting suppliers.

At the time of printing it is hoped that pending releases from Bug Byte will enjoy AGF compatibility.

AGF JOYSTICK COMPATIBLE — AGF JOYSTICK COMPATIBLE — AGF JOYSTICK COMPATIBLE — AGF JOYSTICK COMPATIBLE

AGF Hardware, 26 Van Gogh Place, Bognor Regis, West Sussex PO22 9BY

TRACE

★ For any ZX Spectrum ★

THIS PROGRAM WILL HELP YOU TO:

Debug your BASIC programs quickly and easily.
Understand how other BASIC programs work.
Follow complex BASIC programs step by step.
Teach BASIC quickly and easily.

HOW?

Before the SPECTRUM executes each BASIC statement in your program it will display the line/statement number and the statement itself in the input area (it will not overwrite the main display area). You control the speed from single step to very fast. You can produce a trace listing on the ZX printer, stop your program at any point to print variables or other expressions, and start/stop tracing from anywhere in your program.

THE PRICE?

Only **£6.95** INCLUDING P & P From:

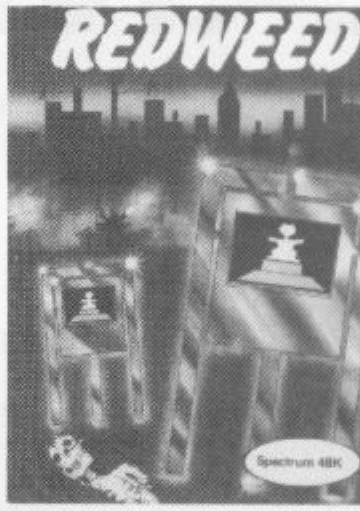
TEXGATE COMPUTERS LTD.
Dept.S., 14 Brook Lane, Corfe Mullen, Dorset BH21 3RD

LOTHLORIEN

THE WARMASTERS

Message from Salisbury HQ:—

---------- Martians have landed ----------
------- death, terror and destruction --------
---- massive three-legged fighting machines ----
------------- intelligent plant -------------
----------- Redweed everywhere -----------
------------- 10 miles away -------------
------ SAVE LONDON AT ALL COSTS -------



- can Britain rely on **YOU?**
- will **YOU** defeat this challenge?
- can you manoeuvre your tanks, artillery and infantry on the battlefield?
- can you destroy the flesh-eating **REDWEED** with your flamethrowers before it disables your army?
- will you be able to lay an effective minefield and attack the **MARTIAN TRIPEDS?**
- will you escape the MARTIAN Weapons?
  - **Projectile accelerators**
  - **Blast canons**
  - **Laser guns**
  - **Gas capsules**
- if you can answer **YES** to the above **you should be playing REDWEED.**

NOTE: this is not an arcade game but a full-graphics tactical war game.

- **15 Levels** of play
- **LOTHLORIEN'S** comprehensive playing instructions included in each cassette
- **SPECTRUM 48K**
- **£5.50**—a small price to pay to save London!

AN EXCELLENT COMPANION TO **JOHNNY REB** also **£5.50** for the **SPECTRUM 48K.**

Authors . . . if you have written a war game (any historical or futuristic period is of interest) which is good enough to publish, then contact us **first. We are the computer war games specialists.**

FOR DETAILS OF THE COMPLETE RANGE OF ZX-81 AND SPECTRUM TITLES PLEASE SEE LAST MONTH'S MAGAZINE OR SEND **s.a.e.**

AVAILABLE FROM BETTER SOFTWARE SHOPS OR DIRECT BY MAIL ORDER. ACCESS NUMBER, CHEQUES OR POSTAL ORDERS PLEASE PAYABLE TO

M. C. LOTHLORIEN
DEPT. SU8, 4, GRANBY ROAD, CHEADLE HULME, CHESHIRE SK8 6LS

---

campbell systems ★ ....put your Spectrum to work ★

MASTERFILE

"The most comprehensive of the data-bases...."
Sinclair User June 1983

Design features

- ★ menu driven
- ★ fully machine coded
- ★ dynamic variable length file— NO WASTED SPACE
- ★ update, erase, copy any record
- ★ you have up to 32K per file
- ★ open ended — ready for microdrive

Files

- ★ up to 26 ITEMS per record
- ★ up to 128 characters per ITEM
- ★ save and load FILE independently of the program
- ★ search FILE for numeric or character comparison — on multiple levels

Display

- ★ up to 36 different user-defined ways of viewing selected data
- ★ sequence by ITEM or chronologically
- ★ 1-21 RECORDS displayed at a time
- ★ pageing
- ★ printing
- ★ scrolling
- ★ TOTAL / AVERAGE any ITEM
- ★ optional USER-BASIC for tailored processing

Now accepted as the definitive filing system for the 48K Spectrum £15.00

Masterfile-16 **a subset for the 16K Spectrum** £8.95

Send your order with a cheque or postal order to Campbell Systems (Dept. S2)
15 Rous Road Buckhurst Hill, Essex IG9 6BL England Telephone 01 504 0589

DLAN Display Language

FOR ZX SPECTRUM 16K/48K

a simple, powerful machine coded interpreter for generating dynamic textual display for use in advertising & education

THE HIT OF THE LAST MICROFAIR

- ★ DLAN commands are all single letter or symbol
- ★ define any window on the screen and recall as often as you like
- ★ print any text you like in any combination of 11 fonts, specially designed by Image Systems in a range of styles and sizes, some with proportional spaced letters
- ★ scroll your text any which way you choose within the window — or the whole screen if you wish
- ★ largest font size 3x2
- ★ word processing keeps left hand margin clean
- ★ BRIGHT, DULL, FLASH, STEADY
- ★ GOSUB equivalent
- ★ screen timing commands
- ★ 48K DLAN gives you 26K of space in which to place your display commands — 16K DLAN gives you 2K
- ★ 8 page manual

★★★★★ SPECIAL INTRODUCTORY OFFER £7.95

THE FAST ONE 16-64K ZX81
"One of the best data-management systems available for the ZX81."
Sinclair User June 1983 £12.00

GULPMAN Spectrum 16/48K £4.95

GULP 2 ZX81 16K £4.75

All programs mailed 1st class by return. Prices include VAT and postage within Europe. SAE for full list.

New polish on old favourites

ORWIN SOFTWARE has released no new software for about six months, so its **Cassette Five** is a long time overdue. As with all Orwin software, it is for the ZX-81 and most of the six programs run in 16K. All except one of the programs are popular arcade games such as **Byteman,** a version of Pac-man, and **Blitz,** a version of City Bomber.

Most of the games are in machine code. The one written in Basic is **Merchant** and its author is Michael Orwin, who started Orwin Software more than a year ago.

Merchant is a strategy game in which you must visit ports such as Alexandria, Venice and Florence. During your stay in Florence you can visit your old friend the moneylender who appears in many of these types of games. He will give you financial assistance or you can leave your money for him to look after. Both options usually result in the same thing.

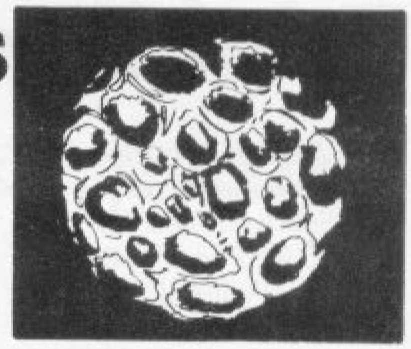
The game includes graphics and, although it is not very original in concept, will provide some entertainment as you try to make your first million.

The other games are machine-coded. They need to be, as they are all arcade favourites. The games are unoriginal in concept but the quality of the software and the smooth action displays created on the screen make the programs worthwhile for anyone who has a ZX-81 and plays games using it.

Most of the games include well-presented instructions which make them easier to play. It is pleasant to see that Orwin's kind of quality is available again.

Cassette Five can be obtained from Orwin Software, 26 Brownlow Road, London, NW 10 9QL. It costs £6.

Tired idea fails to impress



A NEW COMPANY, Orion, has launched into the ZX software market with a lunar lander program for the 16K ZX-81, **Moon Lander.**

Lunar lander programs for the ZX-81 are not something which we encounter very often these days. This type of program idea is well-worn and anyone producing another version should be sent into orbit.

At the start you have a chance to select a practice touchdown. More often than not when playing the game you will be informed that there is a new crater on the lunar surface where you have just landed. For that reason a practice routine is a necessity. When in flight, the control panel with all the landing instruments is shown, together with an indicator marking the height at which you are orbiting round the moon.

That update of the display is fast but the program stops every time it requires an input from the keyboard.

It would have been better to use an INKEY-type routine for it. The game would have been made faster and the player would not have to press NEWLINE for every entry.

The instructions are printed on the cassette insert. They lack structure and provide little useful information to the budding astronaut. The language used would be better understood by a NASA trainee than someone who wants to play a game.

Unfortunately there is not much we can say in favour of the game. It is unoriginal, the instructions are largely unintelligible and the screen display is confusing. It is, however, the first Orion product and should be treated as such.

Moon Lander can be obtained from Orion, Fippbrook Mill, London Road, Dorking, Surrey, RH4 1JE.

User-unfriendly games guide

SINCLAIR RESEARCH has launched two new games, **Sabotage** and **City Patrol,** for the 16K ZX-81. Sabotage is a game in which you must take one of two roles, either the guard or the saboteur. If you choose to be the guard you must protect the randomly-placed boxes of ammunition which litter the compound.

If you are the guard, you will have to corner the saboteur before he can plant explosives in a secret place. If you are not quick enough, the explosives will detonate and you will lose some of the boxes of ammunition.

Your score will decrease depending on how many boxes you lose. If you capture the enemy, the points added to your score will, of course, be unaffected by the number of boxes blown-up.

You may want to take the role of the saboteur. In that case the game changes and you must evade the guard, played by the computer, and plant your explosives. Your score depends on how destructive you can be. The program has an original games concept and the action is reasonably smooth. The only problem occurs in the instructions which are printed on the cassette insert card. The game is explained in simple fashion and the movement keys are shown. The difficulty is that Sinclair Research seems to have taken it for granted that the user will know which key moves the figure which way on the screen. The W and S keys move the character up and down respectively and the H and J keys move it left and right.

Sinclair may be correct in thinking that most users will know which keys do what but many users will certainly be beginners who have just become accustomed to the keyboard.

In City Patrol, a city is on the verge of destruction as enemy fighters zoom in and try to raze buildings to the ground. It is your task to take on those invaders and destroy them. At the very least you must prevent them destroying the skyscrapers.

The game produces a 3D view of the city on the screen. There are four levels of the city and you can select which one you want to enter at the start of the game. We rate the game highly because of its depth of graphics and plot. It is difficult to produce such a smooth 3D effect on the ZX-81.

The instructions are easy to understand but, as with Sabotage, they could be more clearly set out on the cassette insert. We found it difficult to keep track of the instructions because they were cramped into such a small space and, in certain parts, were too verbose. Each instruction insert starts with a story line and if that was abbreviated, more room could be allocated for the playing instructions.

Sabotage and City Patrol are available separately from Sinclair Research, Stanhope Road, Camberley, Surrey, GU15 3PS.

Excellence in combat

THE LATEST release from Artic Computing is for the 48K Spectrum and can only be described as excellent in almost every detail. **Combat Zone** is a version of Tank Battle, a game which can be seen in most amusement arcades. It is a three-dimensional game which has become popular the last few months.

You are the only survivor of a battle fleet of tanks. Your tank roams around a landscape made up of three-dimensional pyramids. You must confront and destroy the enemy tanks and spaceships which attack you.

The display is completely in 3D and although the game is difficult to play at first, strategies can soon be learned and you can become a crack shot.

The author has produced a display format which adheres strictly to that of the type of game you find in arcades. Everything has been finely-tuned to add to the player's enjoyment. You can even specify whether you want to concentrate in total silence.

3D Combat Zone can be obtained from Artic Computing Ltd, 396 James Reckitt Avenue, Hull, North Humberside, HU8 0JA.

Banking on the success of a home accounting system with security

THERE ARE surprisingly few bank account programs for the Spectrum but those which are available are excelent pieces of software.

Bank Account System, for the 48K Spectrum, will store all the details of a bank account, whether they be cash or cheque transactions. It will keep account of the payment of standing orders and also calculate and update the balance.

The system provides full error-trapping and will not allow you to type-in any incorrect answers, although there is an omission at the beginning of the program which could be mistaken for a bug.

When you first use the program you are asked to type-in the present date. When you re-use the system the old date is displayed and you are asked for a new present date. If you enter a date which falls before the old date the program will accept it.

That may serve some historical purpose so far as file-handling is concerned but it could also lead to errors on the system.

The program is well-structured and the user should have no difficulty entering the data required by the computer to do its calculations.

Unlike some other accounting programs which are also written in Basic, the code which stores the password is well hidden in the program lines, although someone who knows a little about the Spectrum could probably by-pass it.

Bank Account System is good value and costs only £3. It is available from K J Gouldstone, 45 Burleigh Avenue, Wallington, Surrey, SM6 7JG.

Pretzel logic fails

IF A COMPANY has produced a compiler for the Spectrum or the ZX-81, the temptation must exist to publish some games which have been produced with the program. Softek has fallen into the trap and produced a range of arcade games, known collectively as **Ultima.**

One of the cassettes in the range, for the 16K Spectrum, is **Firebirds.** It is little more than a thinly-disguised version of Phoenix, or Winged Avenger, with two motherships which look like pretzels floating around the screen.

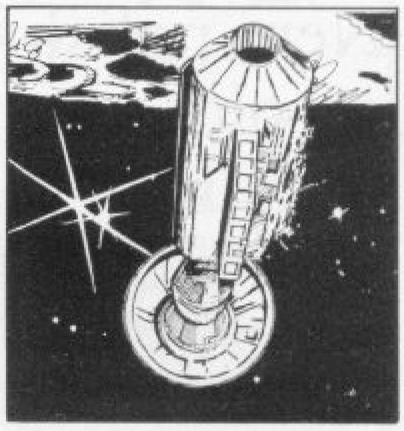
The game is supposed to be set in space but there is no evidence of stars and the screen is black except for the birds, motherships and other moving parts.

Unfortunately the author has not been careful to reduce the effect of colour-clash which occurs when two shapes on different-coloured squares seemingly interact. The effect is worst in the explosion sequences when you can see the outlines of the character squares in which the spaceships were designed originally.

We detected two display bugs on the screen in the second and third phases. Parts of the display disappear during play and no effort seems to have been made to circumvent the difficulty. That at least would be excusable if the effect was not so apparent.

The game could have been reasonably good if more attention had been paid to detail. Perhaps it would be a good idea for Softek to forget about compiler games and produce something in pure machine code. The games may be easy to produce but they are not so much fun to play.

Firebirds can be obtained from Softek, 329 Croxted Road, London SE24. It costs £5.95.



Program tracing

SOME microcomputers, including the Dragon and the BBC microcomputer, have a command call Trace which will run through a program displaying it line by line to show the flow of that program.

The Spectrum has no such command in its Basic language but the omission has been remedied by the release of a machine code routine, also called **Trace,** for both versions of the computer.

The routine lists a user program line by line; when it reaches a GOTO or GOSUB it will jump to the line specified by that instruction.

If Trace finds an error in a program it will inform the user and if an endless loop has been set up in a user program it will be easier to detect.

Unlike the Trace command on some computers, the routine will allow the program to run while it is executing the Trace. The run is performed in the main part of the screen area and it is useful to compare that output to the program line which is creating it at the bottom of the screen.

The routine provides an effective Trace command and is a useful debugging tool. It is easy to use and can be operated with no knowledge of machine code.

Trace can be obtained from Texgate Computers Ltd, 14 Brook Lane, Corfe Mullen, Dorset, BH21 3RD. The package costs £6.95.

Gold star for results storage

TEACHER DATA, for the 48K Spectrum, is an educational program not because it will teach pupils but because it will help teachers to grade examination results.

The program will work out all the statistics required to measure examination achievement and will even assign a grade, between A and E, to each pupil. Records of test passes and failures can be sorted separately on tape. The teacher could create separate files for each form in a school or college.

If a teacher requires a quick read-out of information, the program will create a histogram showing the results of pupils; means and standard deviation can also be calculated for further research.

The program, written by a teacher, is aimed at teachers in state schools and colleges.

It will store up to 400 names in one session, so several big classes can be dealt with at once or even for a whole year.

The calculation part of the program is menu-driven. The menu is cursor-controlled, so you have to move the cursor to the option on the list and press 's' for 'select'. The computer will give you a chance to re-select when you press 's' in case you make a mistake.

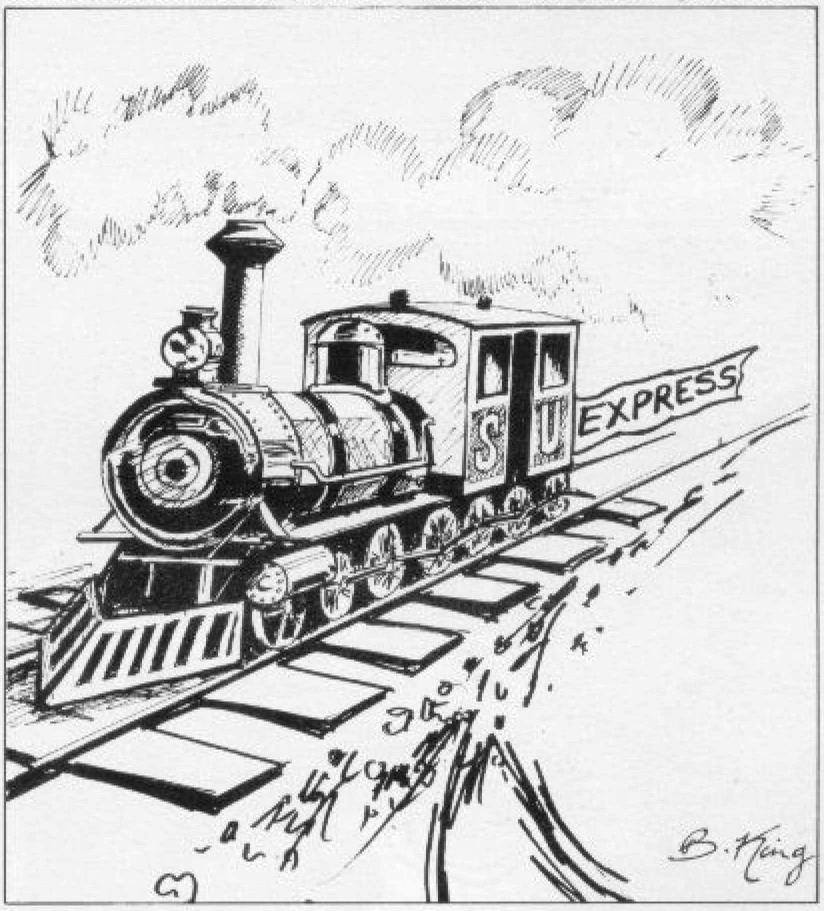
Unfortunately the cursor symbol moves down the list on its own when not under user control, so you have only a limited amount of time to press the 's' key. That is shown as a plus in the package but we regard it as a minus.

Teacher Data receives A-plus so far as we are concerned. It can be obtained from Brian Farris, 8 Thompson Road, Bolton, BL1 6DF and costs £5.20. A version for the 16K Spectrum, with scaled-down features, costs £3.80.

Pac-man gets on right track for a novel game

TRAX is a Pac-man-type game for the 48K Spectrum. The maze is a railway track and the Pac-man is a train. The ghost is played by a white killer train which will do its best to destroy you in a collision. The other obstacle is a tunnel which you must enter at the correct end, which is left, or your train will be derailed.

You may be wondering where the power pills have gone — you cannot have a game of Pac-man without power pills. They are represented by passengers who are waiting beside the track for the train to pick them up. You score points for each passenger who gets on board.



The game contains machine code but, surprisingly, that does not increase the speed of the trains and does not provide a smooth run of action during play.

The sound effects are impressive. When your train moves along the track it makes a chugging noise and when you are caught by the killer train the explosion and fire is effective.

Trax is an original and entertaining game. It should be popular with children of all ages, especially those who never owned a train set.

The package costs £5.50, which is expensive, and it can be obtained from Soft Joe's Software, Business Centre, Claughton Road, Birkenhead, Merseyside L41 6ES.

Dietron lacks weight in the slimming business

IF YOU WANT to know about your weight and the contents of the food you have been consuming, it might be easier to read a book on slimming or dieting than to use **Dietron,** for the 48K Spectrum.

The program provides all the information which you are likely to want about dieting but so does a book. The other problem with the package is the number of bugs and omissions in the system.

Our reviewer entered his weight and height and was greeted with an E Out of Data error at line 56. We were able to correct that by skipping to line 60 but the error is a bad oversight and, so near to the start of the program, raises doubts of accuracy of the program data.

The application has not been very well computerised, as height and weight data have to be entered in either inches and pounds or centimetres and kilos. That means extra calculations for the user who probably calculates weight in stones and height in feet.

The program also includes a database with information on dieting hints and a full nutritional guide. It also provides a weight calculation which will tell you how many months and weeks it will take for you to reduce to a certain weight. No effort has been made to check for unusual entries and we were informed that it would take 831 months and seven weeks to reach a weight of 0 pounds. We calculate that it would take slightly longer.

The Dietron package is ingenious but we cannot say it is particularly useful. It costs £4.50 and can be obtained from computer branches of W H Smith.

YOU'LL GET CAR

dk'tronics



"YOUR SPEED OF DELIVERY PUTS OTHER FIRMS TO SHAME"

(Paul Backhouse, Tadcaster)

SOFTWARE SUPERMARKET

All we do at Software Supermarket is play every Spectrum/ZX81 game we can find, pick out the very best and offer only those to you.

OUR NEW, 24-PAGE, Spectrum only catalogue is out now. (And there's a special seperate ZX81 catalogue.) Free catalogue with every order.

From over 40 countries now, you write praising our quick delivery and our free selection service (it's impartial, too: we produce no programs ourselves.) You say we save you plenty!

And we're quick. Orders usually sent out the same day we receive them. Faulty tapes replaced at once.

You've got a great computer. We've got the great programs. Here's the best of the new and a few all-time greats. All programs work with keyboard: we have tried to show where a joystick can be used if you have one. Lots more in our free catalogue for you! (Mail order or telephone credit card only please.)

48K SPECTRUM ONLY

TIMEGATE *"By far the best arcade action game so far" (S. User) "Fast and furious" (Which Micro?)* KEMPSTON/KEMPSOFT JOYSTIX O.K. Watch from your cockpit as you fight the Squarm: 3D graphics: 5 play levels: training program: hold: hall of fame: loads in 2 x 34K parts: rave reviews everywhere. (Quicksilva) £6.95

PENETRATOR *"Few games for any micro offer as many user facilities" (Practical Computing) "A great game" (P.C.T.)* The best Spectrum 'SCRAMBLE' there is. Amazing graphics. 1 or 2 players. Training program for each stage. PLUS unique CUSTOMIZING MODE - lets you write your own 'SCRAMBLE' without all the effort! (Melbourne House) £6.95

BLACK CRYSTAL *"An excellent graphics adventure" (S. User)* The massive 180K of program, 'loads' from 2 cassettes in 6 chapters. You must solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles, 16 command keys. Instruction manual. (Carnell) £7.50

THE HOBBIT "Takes first place for quality and value for money" *(S. User) "A marvellous game...should set the standard" (ZX Comp).* Free 285 p illustrated book contains clues to help you. 30 beautiful full-screen pictures; 500 word vocabulary; 16 page instruction manual: it took 4 people 18 months to write! (Melbourne House) £14.95

RESCUE *"Excellent...the best adventure game I have ever played" (PCN)* 20 page clearly written on-screen manual leads you to very ingenious 3 stage adventure. Four skill levels. Full information on screen plus a map when you need it! Great fun. (CRL) £5.95.

GREAT BRITAIN LTD. *"A brilliant new game" (Micro User) "About as complex as such a program can be...excellent value for money" (Which Micro?)* Choose your party and run the country. Will unemployment come down or the rioters come out? Watch the results of your rule on election night... (Hessel) £5.95

KNOT IN 3D *"The most astounding thing you'll see for a long time" (PopcompWkly)* KEMPSTON/KEMPSOFT/AGF/MIKROGEN JOYSTIX O.K. You must avoid collision with your own trail and those of up to 4 chasers as you rush through an apparently empty 3D space. Demo mode: 3 skill levels: hold: clear instructions. Brilliant. (New Generation) £5.95.

KNIGHT'S QUEST *"More to my liking than the Hobbit" (PopCompWkly) "will get a great deal of play" (HomeCompWkly)* Very user-friendly, literate adventure with 160-word vocabulary. But remember, dragons are more use alive than dead! Colourful pictures of most locations. (Phipps) £5.95.

ANY SPECTRUM

E.T.X. *"Must be at the limit of the Spectrum's capabilities...graphics are excellent and animation superb" (HomeCompWkly)* Enchanting adventure: 16 landscapes: 1400 power zones: 4 skill levels. In 48K ETX SPEAKS TO YOU AS WELL. KEMPSTON/AGF JOYSTIX O.K. (Abbex) £5.95.

FROGGY *"Uses every available byte in the 16K Spectrum...colour, sound and graphics are used superbly." (HomeCompWkly)* The best Frog there is, we reckon! Loads in two parts. Uses so much power, you even have to unplug your printer! KEMPSTON/KEMPSOFT JOYSTIX O.K. (DJL) £5.95

JUNGLE FEVER Excape down the pigmy death-run. Smashing full-screen animated graphics as you leap raging waterfalls, swing on a rope across deep pits, dodge spiders and poisoned blow darts. Good sound too. On-screen lives, score, hi-score with name, time left. Some of the best graphics we've seen. (A&F) £6.90.

PSST! One of the best new games this season. You have spray cans full of insecticide to protect your beautiful, growing flower from the evil assortment of bugs. Will you beat the bugs? Will you see the amazing bloom? Totally original and great fun. KEMPSTON/KEMPSOFT JOYSTIX O.K. (Ultimate) £5.50.

JET-PAC *"Good graphics, with many small touches that put this program well ahead of the pack" (HCW).* Control your test pilot spacesman with his jet-pack as you build your spaceship, fuel it up and take off for a new planet. All the time avoiding the nasties and collecting treasure! Wonderful! 1 or 2 players. KEMPSTON/KEMPSOFT JOYSTICKS O.K. (Ultimate) £5.50.

JUMPING JACK The very latest from Imagine's inventive programmers. Take for granted the great animated graphics (by a 10 year old!) and the marvellously simple, diabolically ingenious game which uses them (his dad wrote it!) 20 levels. Lots of monsters as you get better at the arcade action. (Imagine) £5.50.

WINGED AVENGER *"Hard to beat" (CVG). "One of the best Sinclair games so far" (PCW).* Very fast 'PHOENIX', 7 play levels, 3 attack waves, laser shield: mothership with smart bombs. A best-seller!. Now 2 versions of the game on this tape! (Work Force) £5.00

3D TANX *"One of my favourite programs" (YrComp)* Shoot the enemy tanks from your moving 3D turret. 3 play levels: accurate ballistics: 1 or 2 players: pause: demo game: training program: even plays God Save The Queen. (DK'tronics) £4.95.

FAUST'S FOLLY The first adventure we've seen that's worth playing in 16K. It's great and it's graphic! Loads in 2 parts: clear instructions: then a smashing adventure with directions, inventory, look, score, save. (Abbex) £5.95.

ZX81 OWNERS

Special 16K ZX81 versions of 4 of these programs are available. Use the coupon to order. Or phone now for your FREE ZX81-only catalogue.

BLACK CRYSTAL	£7.50	WINGED AVENGER	£5.00
KNIGHT'S QUEST	£4.95	FROGGY	£5.95

CHARGE PROGRAMS TO ANY VISA CARD CALL 01-789 8546 (24 hours)

To: Software Supermarket, 87 Howard's Lane, London, SW15 6NU.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number **SU10**

I own a 16K Spectrum ☐ 48K Spectrum ☐ 16K ZX81 ☐ (please tick).

I enclose my Cheque/PO for £.......................... payable to Software Supermarket.

Please use block capitals. If we can't read it, you won't get it.

Name ....

Address ....

.... Postcode ....

Phone, if any, in case we have a query ....

Program Name	Computer	Price
		£
		£
		£
		£
		£
		£
POSTAGE	U.K. Add 55p only per order	£0.55p
AND	EUROPE. Add 55p for each program	£
PACKING	OUTSIDE EUROPE. Add £1 for each - program airmail.	£
	TOTAL	£

Last chance to win a fortune

Join the fight to be the best Sinclair Programmer. There are thousands of £££s to be won in the contest to find the top software writer of 1983.



THIS IS THE LAST chance for programmers, old and new, to earn a fortune and the fame resulting from winning the Cambridge award.

With the closing date of September 20, this is the last issue of *Sinclair User* in which we will give full details and the entry form. So do not delay. Make sure that your entry is bug-free and ready to reach us by the closing date.

In this new competition, the Cambridge Trophy, sponsored jointly by *Sinclair User* and Computer Cases Simulation Ltd, we are searching for the best writers of programs for the Spectrum and ZX-81. We are offering a first prize of £1,000 plus royalties to the person who proves deserving of the title of Winner of the Cambridge Trophy 1983.

The trophy will be awarded annually with a different theme each year. In 1983 the theme is adventure and strategy games. The judges will be looking for a number of factors when making their decision. They include:

Instructions
Program documentation
Graphics and sound
Playability
Lasting appeal
Innovation
Use of machine.

As well as the first prize of £1,000, which can be won by programs for either the Spectrum or the ZX-81, there will be two second prizes of £250, one for the Spectrum and the other for the ZX-81. Similarly there will be two third prizes of £100. In addition there will be 10 runners-up prizes for each machine, consisting of five CCS programs and a free annual subscription to *Sinclair User*.

Fill in the form for your passport to fame and fortune.

The award will be judged by three people well-known in the world of Sinclair computers—Mike Johnston, organiser of the highly-popular ZX Microfairs and consultant editor of *Sinclair User;* Trevor Toms, author of a number of books on the Spectrum and the ZX-81; and John Gilbert, *Sinclair User* software reviewer. The panel will be chaired by Nigel Clark, editor of *Sinclair User,* and Melvin Lloyd-Jones, a director of CCS.



Conditions

- Entries must be on cassette accompanied by a listing, detailed explanation of the program and an entry form. Entrants must warrant that their programs are original.
- Programs only for the Spectrum and ZX-81 will be considered.
- Entries must reach *Sinclair User* at 196-200 Balls Pond Road, London N1 4AQ, by Tuesday, September 20.
- Results will be announced at the Christmas ZX-Microfair in December.
- The entrant assigns CCS the exclusive licence with the right to sublicence, to copy, modify, sell and publish the original or modified program in any form and CCS undertakes to pay a *royalty* fee of 20 percent of the nett invoice price on the sale of such program(s) and further will pay a fee of £10 in respect of each publication of the respective program listing. CCS assigns ECC Publications the exclusive worldwide rights to publish the listings of all entries.
- The winning programs shall become the property of CCS, which undertakes to market the programs and to pay the winner a royalty and fees as detailed.
- The organisers retain the right to offer any entries for use by Micronet on an agreed royalty basis.
- Entries will not be returned.
- The judges' decision is final.
- No correspondence can be entered into between entrants and the organisers.
- Employees of ECC Publications and CCS and their associated companies may not enter.



ENTRY FORM

I agree to abide by the rules of the competition.

Name ....

Address ....

....

Postcode ....**Signature** ....

Send your entries to ECC Publications, 196–200 Balls Pond Road, Islington N1 4AQ.

HIGH STAKES BIG DOUGH

That's the name of the game with our new range of Strategy Games.

Take Autochef for instance.
You'll have to make every decision possible, from buying food and wines to entering into loan contracts with the ambition of taking over your biggest rival.

How does wheeler dealing in the heart of Texas grab you? In Dallas, you'll need all your wits about you to survive in the oil business and maybe even take over the Euing Empire.

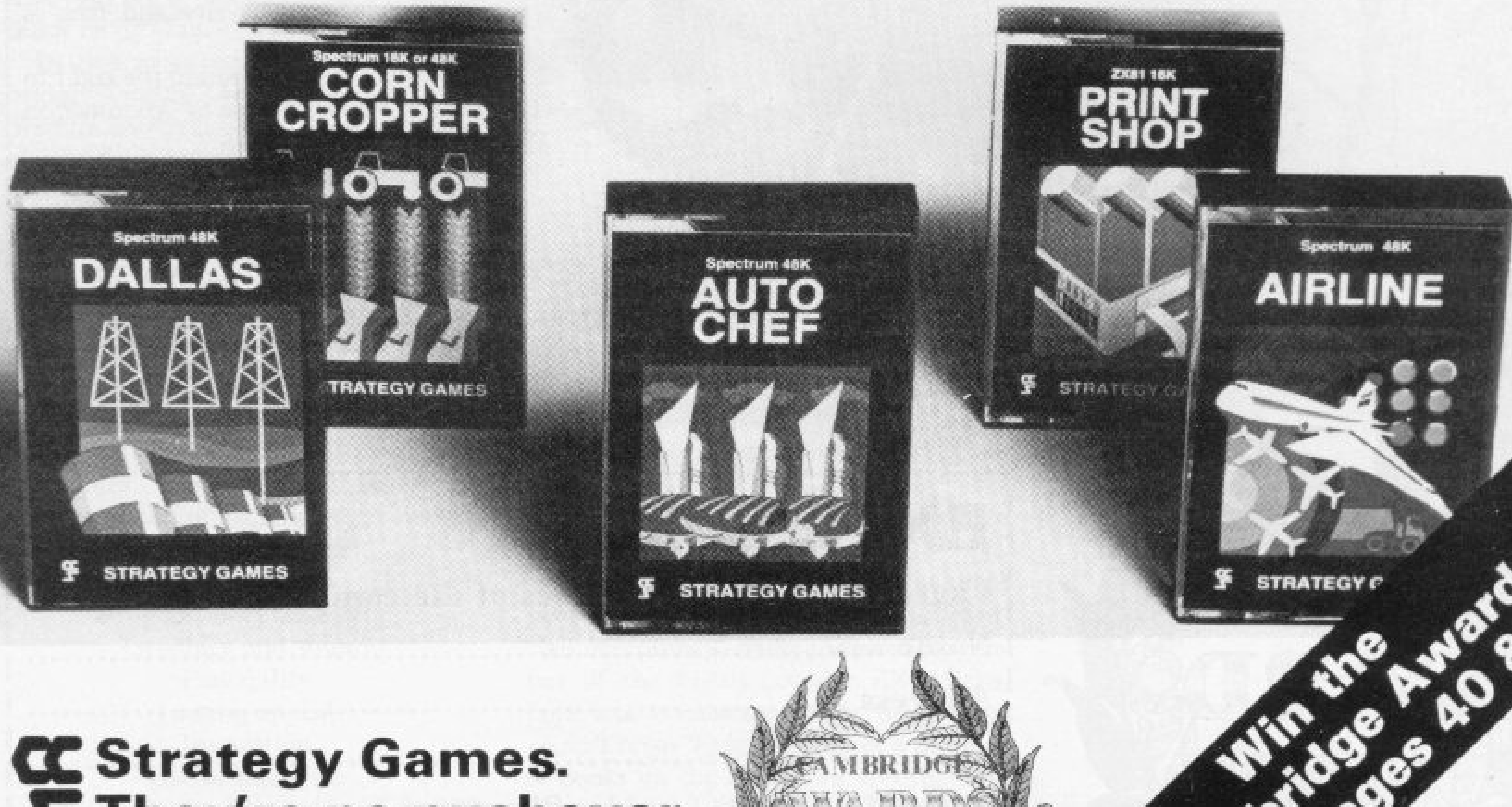
Fly high with Airline and really get the business off the ground – that is if you can handle the costing problems, strikes, cancelled flights, hijacks and aircraft crashes.

If you'd rather keep your feet firmly on the ground, run a wheat farm with Corn Cropper. There are many decisions to be made on machinery and labour costs, when to plant, irrigate, fertilize and harvest.
Print Shop offers you all the problems of a thriving printing business – from staffing to buying stock and making quotations.

Whatever your taste – whatever your skills, we've got a challenge for you!

Autochef, Dallas, Airline, Corn Cropper and Print Shop. ZX81 and Spectrum 16K £5 each
Spectrum 48K £6 each

Available from W H Smith, Boots, Rumbelows and all good computer shops or Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.



Strategy Games.
They're no pushover.



Win the Cambridge Award
Details pages 40 & 41

SPECTRUM
COMPUTING MADE SIMPLE



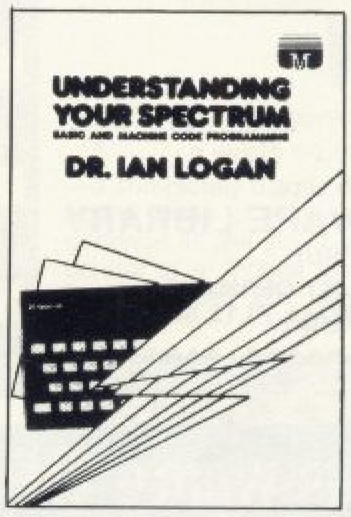
The Complete Spectrum ROM Disassembly
For the serious programmer who wants to get right to the heart of the Spectrum; its 16K ROM control program. Each ROM routine is clearly explained and all functions and entry points within the ROM are made available for use in the user's own programs.
'A useful and interesting book.'
Personal Computing News



Over the Spectrum
30 exciting easy to enter programs designed specifically for the Spectrum. From mind blowing arcade action to intriguing strategy games, this book will allow the first time user to become familiar with how programs actually function.
'A clear winner in the Spectrum Stakes.'
Personal Computer World.



Spectrum Hardware Manual
An indepth explanation for the electronic hobbyist who wants to know how the Spectrum actually works.
The book reveals many features of the Spectrum hardware including a complete rundown on each component's function, full circuit diagrams, and exciting practical construction projects.
'A wealth of ideas.'
Educational Equipment



Understanding your Spectrum
A complete guide to the Spectrum software system for users who want to learn how to program this remarkable micro in both BASIC and Machine Language.
A special section explains how the ROM can be utilised in the user's own programs.
'I cannot recommend this book too highly.'
Practical Computing

DR. LOGAN'S MICRODRIVE BOOK COMING SOON!



Spectrum Machine Language for Beginners
A 'no jargon' introduction to machine language programming for Spectrum users keen to progress beyond the limitations of BASIC. A self test questionnaire is also included.
The book concludes with the development of an entire machine language program from start to finish.

SPECTRUM Books
- ☐ Understanding Your Spectrum £7.95
- ☐ Spectrum Machine Languge for The Absolute Beginner £6.95
- ☐ Over The Spectrum £6.95
- ☐ The Complete Spectrum ROM Disassembly £9.95
- ☐ Spectrum Hardware Manual £5.95
- ☐ Please let me know when Dr. Logan's Microdrive Book is published.

48K SPECTRUM Cassettes
- ☐ Penetrator £6.95
- ☐ The Hobbit £14.95
- ☐ Terror-Daktil 4D £6.95
- ☐ Melbourne Draw £8.95
- ☐ Please send me your free 48 page Catalogue.

Trade enquiries welcome.

All prices include VAT where applicable. Please add 80p for post and pack.

SU9B

I enclose my cheque/money order for £

Please debit my Access Card No. Expiry Date

Signature

Name

Address

Postcode

£

£ + p/p .80

Total

£

Orders to:
131 Trafalgar Road
Greenwich London SE10

Correspondence to:
Melbourne House
Church Yard Tring
Hertfordshire HP23 5LU

All Melbourne House cassette software is unconditionally guaranteed against malfunction. Access orders can be telephoned through on our 24 hr ansafone (01) 858 7397.

MELBOURNE HOUSE

SOFTWARE LIBRARY
FOR
SPECTRUM

Low cost weekly hire of the best arcade games, adventures, utilities, languages and business programs.

- Membership only £6.00 for 12 months.
- Program hiring from only 80p (plus 25p p&p).
- Free fully descriptive catalogue for members.
- New titles constantly being added.
- Purchase new programs at discount prices.
- Return of post service.
- All tapes despatched using first class post.
- We have full permission and licences from the leading software publishers, to whom royalties are paid.

Compare these features with our competitors and you will see why more Spectrum owners are joining the Kernow Software Library. Join today by clipping the coupon below or send a S.A.E. for further details.

☐ YES, please send me my free catalogue and selection sheet. I enclose my £6 cheque/Postal Order.

NAME ....

ADDRESS ....

....

.... TEL ....

Send to:

KERNOW SOFTWARE LIBRARY
(Dept. SU)
55 ELIOT DRIVE, ST GERMANS
SALTASH, CORNWALL PL12 5NL

University Software

LIBRARY OF ADVANCED MATH/STAT/ECON

TAPE 1: MATRIX OPERATIONS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Inversion, multiplication, addition, subtraction and scalar multiplication of matrices and vectors within one single program. Any output can in turn be used as the input of the next operation without re-typing. Capacity: 16K ZX81: 25 × 25, 16K Spectrum: 17 × 17, 48K Spectrum: 48 × 48.
Side B: Determinants of square matrices.

TAPE 2: POLYNOMIALS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the roots with 8 digits of precision.
Side B: You can plot polynomials in any interval and examine their roots, extremum points.

TAPE 3: INTEGRATION — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Integration of functions by Simpson's and trapezoidal rules. Also computes the area enclosed by two functions.
Side B: Plot of integrals. Integration can be visualised on the screen.

TAPE 4: REGRESSION — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A highly developed multivariate regression program featuring Log/Ln option on each variable (thus allowing exponential and geometric regressions), R^2, corrected R^2, standard errors, t-statistics, F-statistics, degrees of freedom, Durbin-Watson statistic, interpolation. Capacity (no of variables × no of observations): 16K ZX81: 2 × 500, 5 × 250, 10 × 140, 16K Spectrum: 2 × 220, 5 × 100, 10 × 50, 48K Spectrum: 2 × 1800, 5 × 900, 10 × 500.
Side B: Plot of bivariate regressions. You can see how your computer draws a best-fitting line on a set of numbered data points.

TAPE 5(a): LINEAR PROGRAMMING — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A user friendly optimisation program capable of handling all sorts of linear programming problems (any combination of $<, =, >$, constraints and $x_i >$, $x_i < 0$, $-\alpha < x_i < \alpha$ sign constraints). Features the cannonical equivalent of the primal, values of slack variables and the dual. Capacity (no of variables × no of constraints); 16K ZX81: 10 × 23, 15 × 20, 20 × 15, 16K Spectrum: 10 × 10, 48K Spectrum: 10 × 50, 25 × 40, 50 × 30.
Side B: Solutions of simultaneous equations.

TAPE 5(b): PROFESSIONAL LINEAR PROGRAMMING — **£14.95**

Available for 16K ZX81 and 48K Spectrum with above features plus 'save-data' and 'change-data' facilities. Any single data entry can be changed without re-typing the whole data.

- Cheques payable to:
  UNIVERSITY SOFTWARE
  29 St Peter's Street
  London N1 8J9
- All incl. prices for the UK.

Tapes 1 – 5(a) Spectrum £35
ZX81 £30



CASSETTE 50
for your MICRO

SPECTRUM
ZX81

ORDER NOW!

GALACTIC ATTACK	MAZE EATER	SUBMARINES
SPACE MISSION	ORBITTER	ROCKET LAUNCH
LUNAR LANDER	MOTORWAY	PLANETS
PLASMA BOLT	FORCE FIELD	BLACK HOLE
STARTREK	NIM	DYNAMITE
RADAR LANDING	TUNNEL ESCAPE	DO YOUR SUMS
ATTACKER	BARREL JUMP	DERBY DASH
GALACTIC DOGFIGHT	CANNONBALL BATTLE	SPACE SEARCH
ZION ATTACK	OVERTAKE	UNIVERSE
IVASIVE ACTION	SITTING TARGET	RATS
OXO	SMASH THE WINDOWS	TANKER
BOGGLES	SPACE SHIP	PARACHUTE
PONTOON	JET FLIGHT	JETMOBILE
SKI JUMP	PHASER	HIGH RISE
HANGMAN	INTRUDER	THE FORCE
OLD BONES	INFERNO	EXCHANGE
THIN ICE	GHOSTS	

WE BUY GAMES CONTACT US NOW

CASCADE SOFTWARE
CASCADES HOUSE
LLANDOGO
MONMOUTH
GWENT
S.WALES NP5 4PA

I ENCLOSE CHEQUE/P.O. FOR £9.95 (WHICH INCLUDES VAT AND DELIVERY).

PLEASE SEND ME 50 GAMES ON A CASSETTE FOR MY ________________ COMPUTER.

NAME ____

ADDRESS ______________________________________

SU

NEW PRICES UP TO 37.5% OFF PLUS FREE P+P!

MEMOTECH

The Complete Range

Fifteen months ago Memotech developed the first 64K Memopak, designed to maximise the capabilities of the Sinclair ZX81. Since then, using the ZX81 as a starting point, we've gone on to produce a comprehensive range of Memopaks, adding 16K and 32K memory expansions, utilities packages comprising a Word Processor, Z80 Assembler and Spreadsheet Analysis, plus Communication Interfaces, High Resolution Graphics and a professional quality Keyboard.

To complete our range of ZX81 add-ons, we are now introducing the MEMOPAK RS232 Serial Interface.

RS232 Interface

The RS232 is an all-purpose interface which allows the ZX81 not only to output to suitable serial printers, but can link up with numerous types of peripheral or even other processors.
The Interface has two main modes of operation: BASIC mode allows you to use the range of functions supplied in the RS232 EPROM within an ordinary BASIC program, and TERMINAL mode allows you to use your ZX81 as a terminal to another processor.
The EPROM functions offered permit the user to send, receive and convert bytes between ZX81 code and ASCII, as well as check the status of numerous control flags. Received or transmitted data can appear simultaneously on the screen, and received data may be printed simultaneously.

£39.95 inc. VAT

Memopak Centronics I/F

The BASIC commands LPRINT, LLIST and COPY are used to print on any CENTRONICS type printer. All ASCII characters are generated and translation takes place automatically within the pack. Reverse capitals give lower case. Additional facilities allow high resolution printing.

£24.95 inc. VAT

Memopak HRG

This pack breaks down the constraints imposed by operating at the ZX81 character level and allows high definition displays to be generated. All 248 × 192 individual pixels can be controlled using simple commands, and the built in software enables the user to work interactively at the dot, line, character, block and page levels.

£29.95 inc. VAT

Memocalc

The screen display behaves as a 'window' on a large sheet of paper on which a table of numbers is laid out. The maximum size of the table is determined by the memory capacity, and with a Memopak 64K a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified.

£29.90 inc. VAT

Memotext

Text is first arranged in 32 character lines for the screen with comprehensive editing facilities. On output the user simply chooses the line length required for printing and the system does the rest. Used with the Memopak Centronics Interface, the Word Processor makes available printout with 80 character lines, upper and lower case and single and double size characters.

£29.90 inc. VAT

Memopak Memory Extensions

For those just setting out on the road to real computing, these packs transform the ZX81 from a toy to a powerful computer. Data storage, extended programming and complex displays all become feasible. Further details available on request.

16K Memopak £24.95 32K Memopak £34.95
64K Memopak £49.95 Prices inclusive of VAT

MEMOPAKS ARE AVAILABLE AT MAIN BRANCHES OF WH SMITH and JOHN MENZIES

Z80 Assembler

The Assembler allows you first to code and edit a source program in the Z80 language, and then assemble it into machine code. You can now write flexible and economic programs.
The Editor mode allows you to code directly in the right format, manipulate individual lines and control the exact placing of source and machine code. Routines may be merged or listed (even to a commercial printer using our Centronics Interface). The assembler mode handles all standard Z80 mnemonics, numbers in hex or decimal, comments and user-selected labels.

£29.90 inc. VAT



Memotech Keyboard

The Memotech plug-in Keyboard plus buffer pack takes the effort out of data entry for ZX81 users. The Keyboard has a light professional touch and is housed in an elegant aluminium case. The simple plug-in system means that you are not obliged to open up your ZX81, use a soldering iron or invalidate your ZX81 warranty.

Keyboard Buffer Pak

The Buffer Pak performs a "housekeeping" function for the Keyboard, interfacing directly with the port of your ZX81.

£34.95 inc. VAT



All Prices are inclusive of VAT, postage and packing.

To Order: Send your Name, Address, Memopaks required, plus a Cheque/Postal Order/Access/Barclaycard number (please state which) to: Memotech Limited, Station Lane Industrial Estate, Witney, Oxon. OX8 6BX. Telephone Witney 2977

We want you to be completely satisfied with your Memopak – all our products carry a 14 day money back guarantee.

FOX ELECTRONICS *Presents*

SPECTRUM UPGRADE KITS

LOWEST PRICE EVER!!!

ONLY! **£21.00 INCL**

(issue 2 machines only)

A high quality kit at a new Low, Low Price, which simply plugs into existing sockets within your Spectrum. No soldering is required and step by step instructions are supplied.

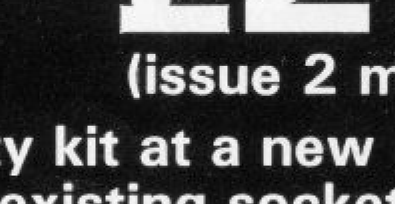
PROBABLY THE BEST KIT AVAILABLE AT DEFINITELY THE LOWEST PRICE

Should you require any more information on the kit (or any other items). Please phone or write to us at the address below.

SPECTRUM/ZX-81 FULLER FD42 KEYBOARD

£29·95
INCL

FOR THE SPECTRUM OR ZX-81. A42 KEY FULL TRAVEL, CASED KEYBOARD WHICH YOUR MACHINE SITS INSIDE, PLUGS IN (NO SOLDERING REQ).



SPECTRUM JOYSTICK

A DELUXE JOYSTICK CONTROLLER COMPLETE WITH INTERFACE AND

- CONTOURED GRIP
- 2 FIRE BUTTONS
- 4 FEET OF CORD
- 4 SUCTION CAP GRIPS FOR TABLE

TOP CONTROL **£19·50**

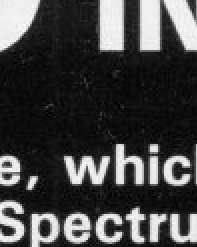
DEALER ENQUIRIES WELCOME

Many other Products

ZX-81

THE BEST AVAILABLE EXPANDABLE RAM PACK AT THESE NEW LOW PRICES!!

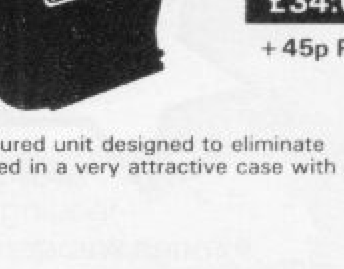
16K	32K
£19.50	£34.00
+45p P&P	+45p P&P



The ZX-Panda a specially contoured unit designed to eliminate wobble and memory loss, housed in a very attractive case with red LED on/off indication.

ZX-81

Another replacement keyboard-this one with a calculator type feel. Peel off backing and press to fit. Incredibly low price of £10.00



Z X 8 1

Z X 8 1

AVAILABLE EX-STOCK
Send S.A.E. for details

CALLERS WELCOME
BY APPOINTMENT

SEND NOW TO:
FOX ELECTRONICS
141 Abbey Road, Basingstoke, Hants. Tel: 0256 20671

The technique of 3D has been growing in popularity. John Gilbert finds it is not always used in the best ways

Extra dimension adds excitement to games

THREE-DIMENSIONAL games are increasing in popularity and software houses are beginning to see that 3D techniques have great potential in a market where Space Invaders and Pac-man are rapidly becoming outdated.

Programmers are starting to use sophisticated techniques to achieve three-dimensional effects on the computer screen which seem more life-like than the two-dimensional space-battle games.

The effects are difficult to create, as the programmer is working in three planes, or directions, instead of the usual two. Most shapes are produced on the screen using X and Y co-ordinates which correspond to the flat horizontal and vertical dimensions. Three-dimensional shapes are constructed using an extra axis which, in theory, moves away from or towards the computer screen.

The new axis is called Z and it is the inclusion of that dimension which gives the three-dimensional figure its depth. When a 3D shape moves up, down and sideways it uses the X and Y dimensions. When it seems to move towards you on the screen it is using the Z axis, which exists only in theory, as the computer screen is flat and two-dimensional in shape.

J K Greye was the first company to produce games using three-dimensional effects on the ZX-81. The game was called **3D Monster Maze** and the player had to move around a three-dimensional maze to find the exit and also to evade the deadly jaws of the dinosaur which prowled around the corridors.

Even those critics who dismissed the ZX-81 as a child's toy had to admit that the program was innovative and well-presented. Monster Maze marked the rise of the use of 3D techniques on microcomputers as small as the ZX-81 and Spectrum.

After the release of 3D Monster Maze, everyone could see the potential of three-dimensional games and utility packages on small machines. Using 3D techniques programmers can portray events which seem real to computer users when they are playing a game.

Three-dimensional effects also hide the inadequacies of the computers on which games are played. The dinosaur which chased the player around a maze in the New Generation game was created using the standard ZX-81 character set. That is not noticeable when the game is being played and you could be forgiven for thinking that it used high-resolution graphics.

The use of 3D gives a game added depth but at the same time it can also be used to disguise a poor plot.

The latest game fron New Generation Software, **3D Knot,** is an example of that. While the game has a basic plot it is not deep enough when you strip away the 3D effects. That does not make it a complete failure in this case but it points to the fact that three-dimensional graphics are a means and not an end.

There are two types of three-dimensional effect. The first, and simplest to produce, is shown in the Artic Computing game for the 48K Spectrum, **Combat Zone.** The three-dimensional shapes are shown as line drawings with no shading. That means you can see all the lines of the shapes, including those which would normally be invisible if colouring and shading had been added to the figures.

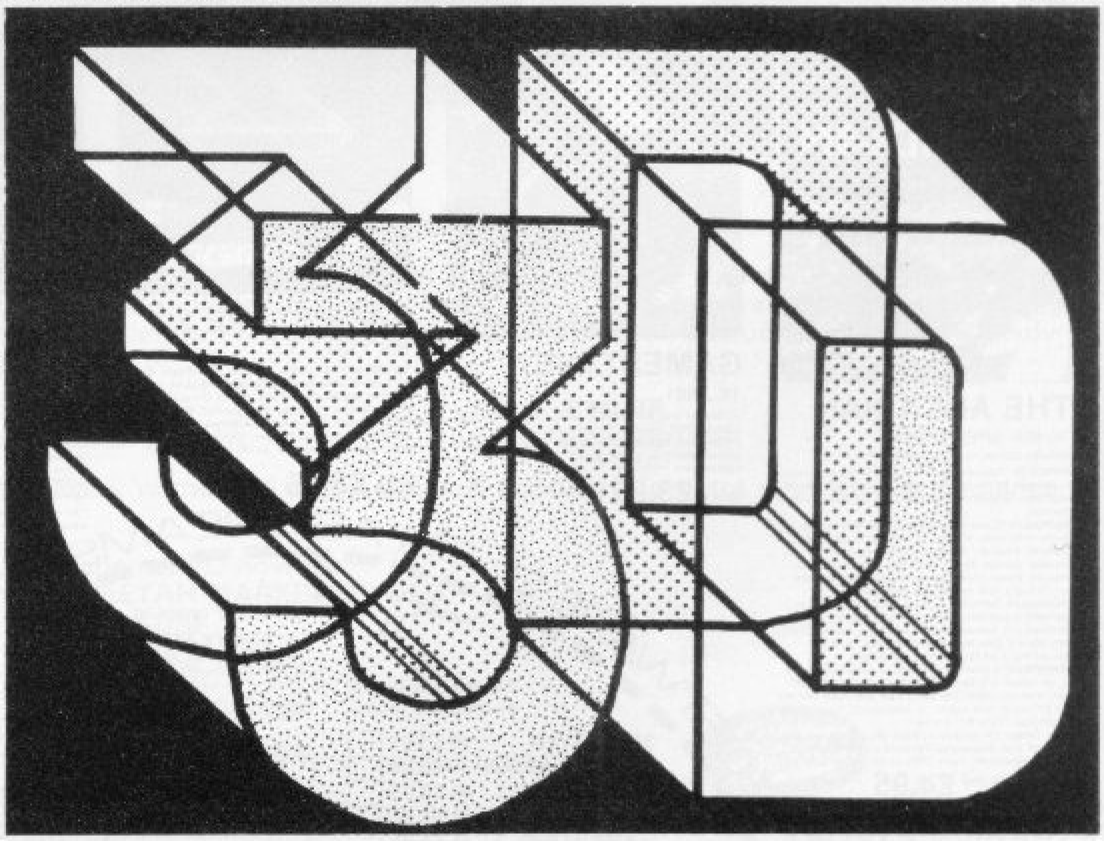
Combat Zone, like so many other pieces of software for the Spectrum, is not new in concept. It is a version of the arcade game of the same name. Although the graphics are reasonable the animation of the line-drawn shapes is very jerky.

The plot involves the player as the last of a race of tank commanders. Enemy tanks and diamond-shaped spaceships are dotted round the landscape and it is the commander's job to destroy them.

The game involves plenty of action and credit must go to the programmers who have managed to produce images which do not bend out of perspective as they move. Artic seems to have taken the easy way out, however, as the program is so slow that it must use those notorious Sinclair line-drawing routines which are in the Spectrum ROM operating system.

The Sinclair graphics routines are not known for their speed, so it would

continued on page 50



continued from page 49

have been better for Artic to write new graphics routines into the main body of the Combat Zone program.

The second type of three-dimensional image is produced reasonably well in the Quicksilva 48K Spectrum game, **Time Gate.** The graphics for that type of image are more difficult to produce, as the programmer has to shade and colour the shapes to produce a picture which looks three-dimensional.

If the shading or the shape of the image is even slightly incorrect the picture will appear to be distorted and the effect will ruin the playability of the game.

The three-dimensional effects created in Time Gate show a slight distortion of image, which can be noted when an enemy ship approaches closer to the viewing screen of the player's ship. The enemy seems to unfold its wings as it gets closer and in some cases it appears as if the fixed wings materialise from nowhere.

No doubt Quicksilva would explain that as a feature of the game but all too often features such as that are errors and are explained away too easily.

The ending of Time Gate is disappointing, as the three-dimensional technique seems to have been thrown out of the window. When you have destroyed the enemy you must approach its base planet. The planet becomes larger as if an approach is being made but the technique being used is so obvious that it is embarrassing to watch.

The program uses what again appears to be the Sinclair high-resolution routines to draw circles which start small and continue to grow bigger. As they increase in size the drawing process slows and the technique becomes even more obvious.

It would have been better to do what New Generation did with **3D Tunnel** on the Spectrum and create several separate pictures in memory to switch on to the screen one at a time in sequence. That will produce an animated effect.

If Quicksilva used that technique the planet could have been produced in high resolution at several stages of approach and would have looked like a real planet and not a rope mat.

Time Gate has its technical faults where graphics are concerned but it is playable. The 3D Tunnel from New Generation, on the other hand, has what can only be described as brilliant and imaginative graphics but it is almost impossible to play to the end.

The game takes you and your laser base through an underground tunnel inhabited by rats, spiders, toads and a very impressive tube train. Unfortunately so much memory seems to have been used to create the three-dimensional effects that the movement of the player's laser base is awkward.

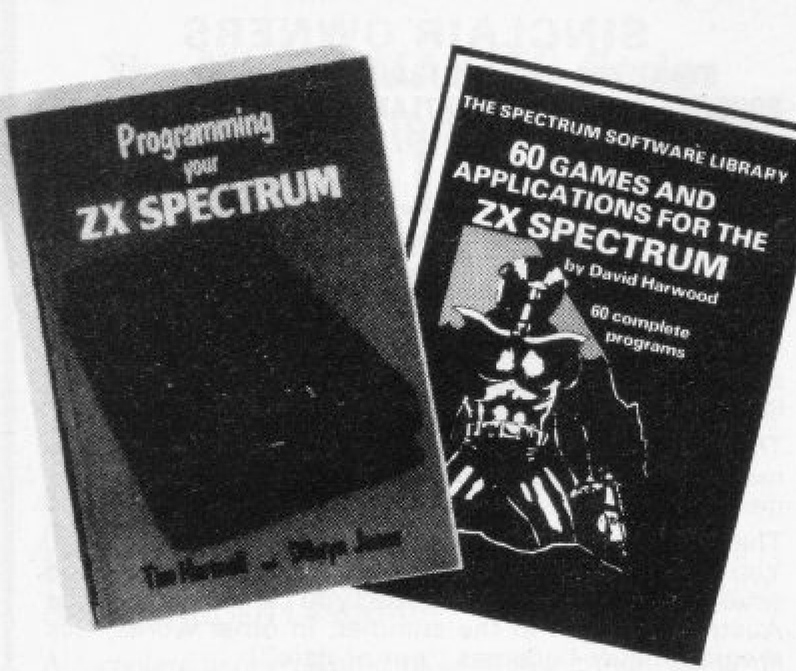
More attention could have been paid to that area of the game, as movement of the base is not smooth or quick enough. That is understandable, however, as a great deal of memory has been used to produce the displays. Apart from that problem 3D Tunnel has the best graphics for a Spectrum game.

There are still very few 3D games for Sinclair machines, although those available give confidence that this sphere is developing in the proper way.

In the next few months we could see a move away from 3D arcade games and into 3D adventure games. There are already a few graphics adventures on the market but they do not use 3D.

As 3D techniques are developed, computers will be better able to produce simulations of the real world. Adventures will become more exciting and arcade games more dynamic. The 3D field is, however, just starting to develop but it has a long way to go before perfect holographic images can be produced on a small computer.

SPECTRUM



Make the most of your Spectrum, with these acclaimed books from the experts!

( ) **INSTANT SPECTRUM PROGRAMMING** — Tim Hartnell. Spoken word C-60 cassette with book containing many major programs, to teach you programming the Spectrum from first steps. The ideal guide if the Spectrum is your first computer. £4.95.

( ) **CREATING ARCADE GAMES ON THE ZX SPECTRUM** — Daniel Haywood. Full programming instructions to improve and enhance your own work, with 17 major programs listed in full as a bonus. £3.95.

( ) **PROGRAMMING YOUR ZX SPECTRUM** — Tim Hartnell and Dilwyn Jones. 200 pages, more than 100 programs, to take your through programming the Spectrum from the beginning. Written by Tim Hartnell, the most widely published ZX author in the world. Recommended by PCW, Sinclair User and Personal Computer Today. £6.95.

( ) **BEYOND SIMPLE BASIC — DELVING DEEPER INTO YOUR ZX SPECTRUM** — Dilwyn Jones. When you've mastered introductory programming on the Spectrum, you need this oustanding guide to enhanced programming techniques and concepts. £7.95.

( ) **60 GAMES AND APPLICATIONS FOR THE SPECTRUM** — David Harwood. Arcade games, intelligent board games, brain games and utility programs, they're all here. Just £4.95.

( ) **GAMES ZX COMPUTERS PLAY** — edited by Tim Hartnell. Thirty great games for your ZX computer, 15 for the Spectrum, 15 for the 16K ZX81. Only £3.25.

Interface Publications,
Dept. SC
44-46 Earls Court Road, London, W8 6EJ.

Please send me the books indicated above. I enclose £________.

Name________________

Address________________

NEED TO EXPAND YOUR MEMORY?



AEL 16K RAMPACK	AEL 16K RAMPACK
FOR SINCLAIR ZX81 in black case	FOR VIC 20 COMMODORE in cartridge
£17.00* + VAT (inc. price £19.55)	£33.45 + VAT (inc. price £38.45)
* Special price for limited period only	

TWELVE MONTHS WARRANTY

2½% discount on orders over £100

Cheques/P.O.'s (add 50p P & P for single orders) to:
Akintech Electronic Laboratories, The Malthouse, Bay Road, Gillingham, Dorset SP8 4PE. Tel: (07476) 4591. Telex: 477019
Telephone and written enquiries welcome.
Allow 10–21 days for delivery.

AKINTECH ELECTRONIC LABORATORIES



New action sports games feature a 3D view of the game. In football and tennis you play one side, the computer plays the other. The computer is fast and hard to beat. Different skill levels.

FOOTBALL
Each player can move, shoot etc. independently. Includes fouls if players collide, corners, throw-ins etc. Scale 90 minutes play. Any team of names can be used. Game can be suspended and player numbers shown at the press of a key. **Price £5.50.**

BIG MATCH SOCCER
Just like football game but for 2 players. Each player uses keys at his side of the keyboard to control his men. All men can be moved, shoot etc. independently. Practice with football then play your friends in the big match. **Price £5.50.**

SUPER SOCCER
A deluxe version of the football. Even faster action, harder to beat. Choose team colours etc. **Price £7.00.**

TENNIS
Each key plays a different stroke. Move your players anywhere on court. Computer plays a hard game. All tennis rules used, just like the real thing. Proper serving and scoring. Plays 3 sets. Animated figures. **PRICE £5.50.**

TANK BATTLE
3D view from the tanks' turret of woods, villages, attacking tanks etc. Shots can destroy buildings, trees and enemy tanks. 360 degree turret movement. **Price £4.50.**

CAR RACE
You drive one car, the computer the other. Control your car with steering and brakes. Choice of 2 circuits. Lap counters and time recorded. **Price £3.95.**

Buy any 3 games, get any game free
Please add 35p post and packing per order

Winters Ltd, Dept SU, 24 Swannington Close, Cantley, Doncaster, S Yorkshire, DN4 6UA

Purchase of used Sinclairs needs much care

Stephen Adams plots the pitfalls of the used market

THERE ARE precautions which need to be taken when buying second-hand, as most equipment is sold "as seen". That means that you buy a computer with no comeback to the seller, as you determine whether anything works. Here is a simple list of things to check on ZX computers and it could well apply to the purchase of other computers.

Make sure you know what you are buying. Like buying any computer, first find what it is you are intending to buy. Read the advertisements and if they are for different models make sure you know what the differences are. Try to find someone who has one and see what they think of your intended purchase. Also ask if you can try his computer to get the feel of it.

If it has some extra items, such as a printer — usually called peripherals—make sure that you know what they are like, too, as they may be offered with the computer as a package which may not be split. There is no point in having a Sinclair printer without a computer. If you have no friend to ask, try a computer shop, explaining first that you are intending to buy a similar machine and are not just wanting to play games on the shop computer.

The price of computers is falling rapidly, especially with the introduction of new models every year. ZX-81s can be bought for as little as £20 for the basic 1K model, 16K RAM pack models about £50. Prices for Spectrum 16K and 48K models are still indeterminate as Sinclair has just lowered the price to compete with other manufacturers — but never pay more than current price for the computer.

The weekly magazines are usually the best place to look for a computer, as the time between an advertisement being received and published is shorter. Check what is being offered with the computer and is included in the price — does it include postage, for instance, if you are buying by mail order?

Software should be treated with suspicion, as it is no use without the computer and costs so much initially to buy. Usually it cannot be sold on its own, so "includes £200 of software" should be treated as unimportant to the main price of the item.

It is not a good idea to buy from shops second-hand as they have to make a profit from somewhere and that usually means you, the customer.

Is the computer in its original packaging and does it include the manual and leads which are needed to operate it? If you can visit the seller, you can check the computer and equipment yourself. Look for worn jack sockets — they are difficult to replace — which are spotted easily as the plugs move about in them. That causes bad contact and intermittent power supply, crashes or loss of LOADing or SAVEing. The edge connectors can also wear out as they are only solder-plated and can be scraped away with over-use.

'It is not a good idea to buy from shops as they have to make a profit from somewhere'



Ask to see the computer working for at least half an hour — that helps to detect over-heating problems — and try to SAVE and LOAD tapes using your own tape recorder, if you have one, at the beginning and end of the half-hour.

Check the keyboard for signs of wear and see if any of the ZX-81 keys are "dished inwards", indicating over-heavy use. Those keys will probably be the cursor keys and will be very difficult to operate. Also check the TV display to see if it wobbles about at the side; that is caused usually by a poor power pack or over-heating.

If you are allowed to remove the top, check for modifications to the board. On model 1 Spectrums there was an extra IC added which was sometimes soldered to the board, using flimsy wires; check that that IC is well-secured with tape and not wandering about the circuit board. On model two Spectrums an extra transistor has been added near the Z-80A; that is normal and fitted by Sinclair.

Sinclair printers are often offered as a package with the computer and are provided with a large power supply — 1.2 amps. Make sure you receive that if you buy a ZX-81 with printer, as otherwise neither the computer nor the printer will work with the original 750ma power supply and would damage it.

ZX-81 hardware does not usually wear out but Sinclair 16K RAM packs seem to lose their grip with age and can intensify the original RAM pack wobble experienced with them.

I hope these hints will help you when attempting to buy a good second-hand Sinclair computer.

Remember that it is pointless having a computer unless you want to do something with it. So make sure it fits the purpose you have in mind, even if it makes you decide against a Sinclair.

"...a really professional program for a micro-computer ...100% value for money" Home Computing Weekly.

BRIDGE MASTER

Bridge is more than just a card game. It is a compulsive hobby and a means of making friends wherever you go.

For the beginner the problem is how to learn the game. Where do you find a good teacher? Where do you find the patient partners you need while you learn?

Bridgemaster overcomes these problems. You bid and play the hands in exactly the same manner as you would at the card table. The computer supplies your partners and Terence Reese, a world expert, coaches you through all stages of the game.

The package contains commentary tapes, computer tapes and a useful reference book – everything you need to learn bridge.

For the Sinclair ZX Spectrum 16/48K – **£24.95.** For the ZX81 16K – **£19.95,** ZX81 1K – **£19.95.***

Available from Boots, W.H. Smith and other leading computer stores or direct from Bridgemaster, Dept. S1, FREEPOST, PO Box 163, Slough SL2 3YY.

*Prices include VAT, post and packing. Cheques & PO's should be made payable to Bridgemaster.

SPECTRUM RAM UPGRADE 16K→48K

A GREAT NEW DEAL!

£20.99

EASY TO FIT. CHIPS JUST PLUG IN. NO SOLDERING. SENT WITHIN 10 DAYS

INCL. VAT, P. & P.

ISSUE TWO MACHINES ONLY (BLUE KEYS)

S.A.E. for details, please.

* * * * * * * * * * * * * * *

DISPLAY INSTRUCTION SHEET

Get the best possible results from your Spectrum. Deals with yellowish white, wobbling colours etc. Send £1 plus Stamped Addressed Envelope

MAIL ORDERS ONLY. Cheques/P.Os to:
FOUNTAIN COMPUTERS LIMITED
Bishops Court,
Bishopstoke,
EASTLEIGH
Hants, SO5 6PE
(0703) 616505

SORRY, NO OVERSEAS ORDERS ACCEPTED (including BFPO, Channel Islands and Eire).

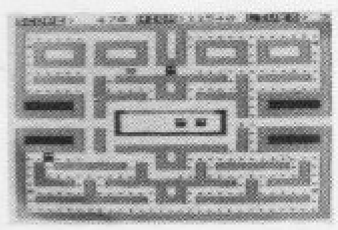
DJL SOFTWARE

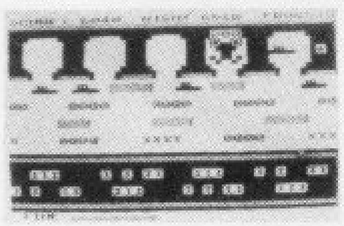
DJL

DEPT SP, 9 TWEED CLOSE, SWINDON, WILTS SN2 3PU

Tel: (0793) 724317 Trade enquiries welcome

Export Orders: Please add £1.00 per tape airmail





ZUCKMAN
ZX81 (16K)
*ALL MACHINE CODE (10K)
*FOUR INDEPENDENT GHOSTS
* HIGH-SCORE 'HALL OF FAME'
*AUTHENTIC ARCADE ACTION
*TITLE/DISPLAY MODE
ONLY £4.95 INC. P&P

FROGGY
ZX81 (16K)
*MOVING CARS, LOGS, TURTLES
*ALLIGATORS, DIVING TURTLES
*FOUR 'SCREENS' OF ACTION
*ALL ARCADE FEATURES
*ENTIRELY MACHINE CODE
ONLY £4.95 INC. P&P

NEW ZX Spectrum NEW
FROGGY 16K or 48K

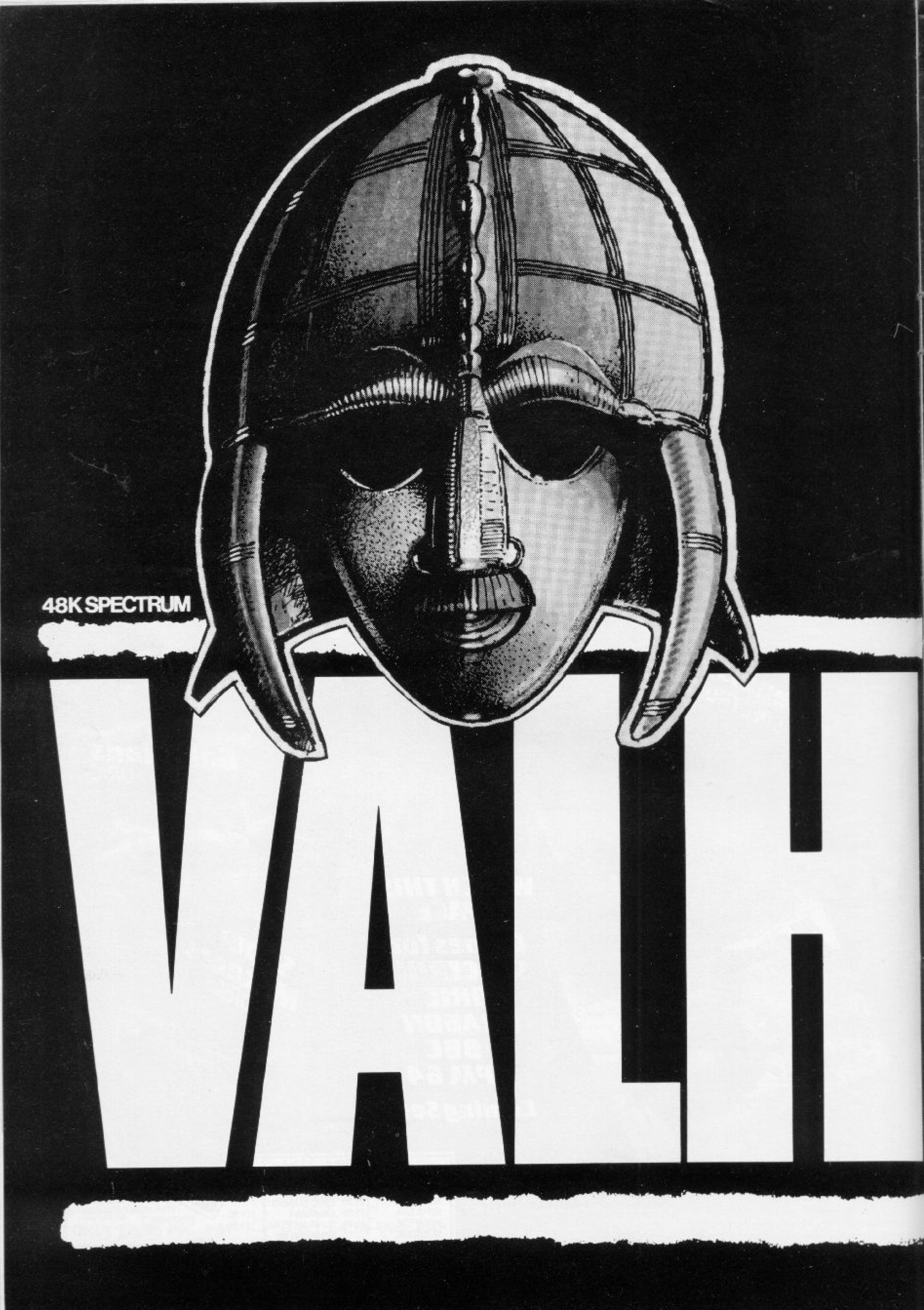
SPECTRUM VERSION OF ARCADE GAME WITH FULL ARCADE FEATURES:



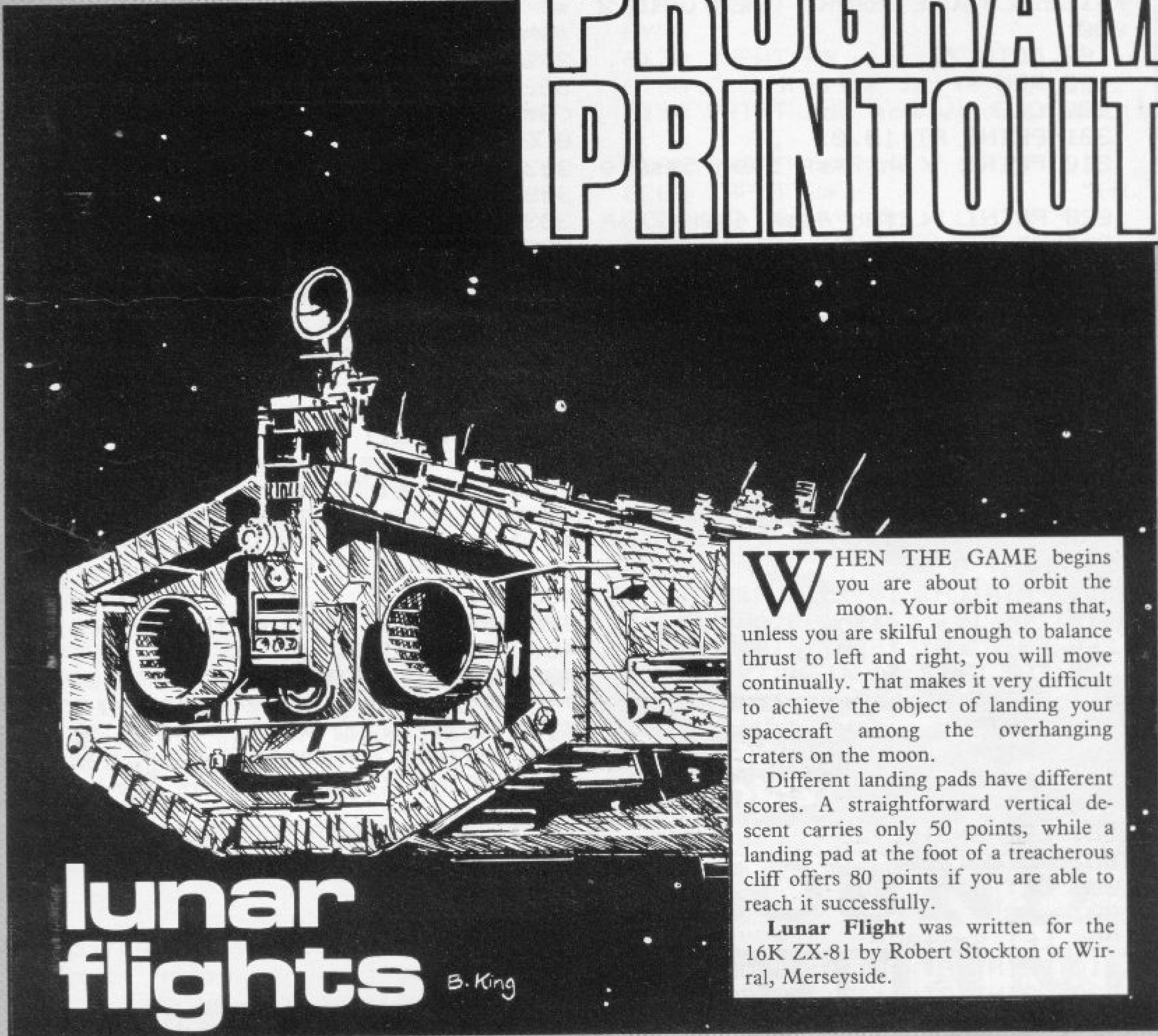
★ Fabulous Hi-Res Colour Graphics
★ Authentic Sound Effects + 3 Tunes
★ 3-D Logs, Swimming & Diving Turtles
★ 3 Lanes of Multi-coloured vehicles
★ On-screen Score, Hi-Score, Time-bar
★ Snake, Alligators and Baby Frog
★ 'Top 5' High-Score initials table
★ Demonstration Game routine

Your home-sick frog must leap across a busy main road, then onto logs and turtles in the river to reach safety of the river-bank frog-homes. THIS MACHINE-CODE GAME MUST BE SEEN TO BE BELEIVED!!

ONLY £5.95 INC. P & P


48K SPECTRUM
VALH

PROGRAM PRINTOUT



lunar flights

WHEN THE GAME begins you are about to orbit the moon. Your orbit means that, unless you are skilful enough to balance thrust to left and right, you will move continually. That makes it very difficult to achieve the object of landing your spacecraft among the overhanging craters on the moon.

Different landing pads have different scores. A straightforward vertical descent carries only 50 points, while a landing pad at the foot of a treacherous cliff offers 80 points if you are able to reach it successfully.

Lunar Flight was written for the 16K ZX-81 by Robert Stockton of Wirral, Merseyside.

```
   1 REM main loop
   2 LET O=0
   3 GOSUB 3000
   4 GOTO 20
   5 GOSUB 200
   6 LET X=1
  10 LET S=0
  20 LET SC=100
  30 LET A=0
  40 LET B=1
  50 LET C=PEEK (PEEK 16398+256*
PEEK 16399)
  60 LET D=0
  70 PRINT AT A,B;"a"
  80 LET D=D+(INKEY$="8")-(INKEY
$="5")
  90 IF INKEY$="0" THEN LET D=0
  95 PRINT AT A,B;"a"
 100 PRINT AT A,B;" "
 101 IF B+D<0 THEN LET B=B+D+31
 102 IF B+D>31 THEN LET B=B+D-31
 110 LET B=B+D
 120 IF INKEY$="0" THEN LET A=A-
2
 121 IF INKEY$="9" THEN LET A=A+
1
 123 LET SC=SC-1
 125 IF OI=1 THEN IF A<>0 THEN L
ET A=A+1
 126 IF OI=0 THEN LET A=A+1
 130 PRINT AT A,B;
 140 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "(99)" THEN GOTO 1
006
 145 IF PEEK (PEEK 16398+256*PEE
K 16399)=CODE "(97)" THEN GOTO 1
000
 150 IF PEEK (PEEK 16398+256*PEE
```

more over.

```
K 16399)=CODE "(9h)" THEN GOTO 2
000
 180 GOTO 70
 190 REM print screen 1
 200 CLS
 201 PRINT AT 10,0;
 210 PRINT "(9h:7*sP:5*9h:5*sP:9
h)"
 220 PRINT "(2*9h:4*sP:4*9h:7*sP
:2*9h)"
 230 PRINT "(2*9h:4*sP:3*9h:7*sP
:3*9h)"
 240 PRINT "(3*9h:3*sP:2*9h:5*sP
:6*9h)"
 250 PRINT "(3*9h:2*97:4*9h:2*99
:8*9h)"
 255 PRINT "(3*9h)20(5*9h)80(7*9
h)"
 256 FOR G=1+10 TO 6+10
 257 PRINT AT G,19;"(8*9h:sP:5*9
h)"
 258 NEXT G
 259 PRINT AT 15,19;"(8*9h:99:9h
)";AT 16,19;"(7*9h)80(9h)"
 260 PRINT AT 16,0;"(19*9h)"
 270 FOR G=17 TO 16+4
 271 PRINT AT G,0;"(32*9h)"
 272 NEXT G
 290 RETURN
 999 REM landed
1000 CLS
1001 LET S=S+SC+20
1002 GOTO 1010
1006 LET SC=SC+80
1007 CLS
1008 LET S=S+SC
1010 PRINT AT 10,10;"SCORE=";S
1020 PRINT AT 11,3;"PRESS NEWLIN
E TO CONT PLAY "
1030 INPUT A$
1031 CLS
1050 GOTO 0
1060 REM crashed
2000 CLS
2010 PRINT AT 10,10;"THE END"
2030 PRINT AT 11,8;"YOU CRASHED"
2040 PRINT AT 12,8;"PRESS NEWLIN
E"
2045 PRINT AT 13,9;"SCORE=";S
2050 INPUT A$
2060 GOTO 4000
2090 REM print screen 2
3000 PRINT AT 10,0;
3010 PRINT "(2*9h:6*sP:4*9h:5*sP
:3*9h:3*sP:3*9h:2*sP:7*9h:3*sP:7
*9h:2*sP:6*9h:3*sP:9h:4*sP:7*9h:
2*sP:4*9h:7*sP:5*9h:2*sP:9h:5*sP
:6*9h:3*sP:3*9h:4*sP:9h:3*sP:4*9
h:2*sP:9h:sP:2*9h:3*sP:5*9h:3*sP
:3*9h:4*sP:9h:3*sP:4*9h:2*sP:9h:
sP:2*9h:3*sP:5*9h:3*97:3*9h:99:4
*9h:3*99:4*9h:2*97:9h:99:2*9h:99
2*97:9h)"
3020 PRINT "(4*9h)20(isP:3*9h)80
(3*9h)80(5*9h)20(9h:isP)80(isP)2
0((9h)"
3030 PRINT "(32*9h)"
3031 FOR F=1 TO X
3032 SCROLL
3033 NEXT F
3034 LET X=X+1
3035 IF X>8 THEN LET X=8
3036 LET O=O+1
3037 IF O=10 THEN GOTO 190
3040 RETURN
3060 GOTO 5
4000 REM hall of fame and high
                high score
4010 FOR J=1 TO 10
4020 IF S>=L(J) THEN GOSUB 5000
4030 IF S>=L(J) THEN GOTO 4200
4040 NEXT J
4055 CLS
4060 PRINT "      top 10 players"
4070 FOR J=1 TO 10
4080 PRINT J;TAB 3;L(J);AT J,10;
" ";N$(J)
4100 NEXT J
4101 PRINT
4102 PRINT "input |i| to see ins
trucions"
4110 INPUT A$
4115 IF A$<>"" THEN GOTO 6000
4120 GOTO 5
4200 CLS
4210 PRINT "  you are in the top
 ten please          enter your
name"
4220 PRINT "  no longer than twe
nty letters"
4230 INPUT N$(J)
4240 IF LEN N$(J)>20 THEN GOTO 4
200
4245 LET L(J)=S
4250 GOTO 4055
4260 REM dim arrays
4270 DIM N$(10,20)
4280 DIM L(10)
4290 GOTO 6000
4300 REM save program
4310 SAVE "LUNER LANDEr"
4320 GOTO 4260
5000 REM change top ten
5010 FOR P=9 TO J STEP -1
5020 LET L(P)=L(P+1)
5030 LET N$(P+1)=N$(P)
5040 NEXT P
5050 RETURN
6000 REM instions
6005 CLS
```

```
6010 PRINT "                lunar lan
der"
6020 PRINT
6030 PRINT "CONTROLS"
6040 PRINT "5=LEFT  8=RIGHT  0=T
HRUST                9=DOWARD THRUST"
6050 PRINT
6060 PRINT "THE OBJECT IS TO LAN
D ON A PAD"
6070 PRINT "TO DO THIS YOU GUIDE
 YOUR SHIP"
6080 PRINT """a"" WITH THE CONTR
OLS (5:8:0)"
6090 PRINT "THE THRUST MOVES YOU
 UP AND"
6100 PRINT "STOPS YOU FROM DRIFT
ING"
6110 PRINT "IF YOU USE 5:8 AND Y
OU KEEP "
6120 PRINT "YOUR FINGER ON THE B
UTTON YOU"
6130 PRINT "DRIFT IN THAT DIRECT
ION FASTER"
6135 PRINT "TO COME OUT OF ORBIT
 PRESS ""9"""
6140 PRINT "IF YOU WANT THESE IN
STRUCTIONS"
6150 PRINT "AGAIN WHEN THE TOP S
CORES ARE   DISPLAYED TYPE ""I""
"
6160 PRINT "PRESS NEW LINE TO PL
AY"
6170 INPUT A$
6180 CLS
6190 PRINT "do you want an orbit
"
6195 PRINT "enter y or n"
6200 INPUT O$
6210 IF O$="Y" THEN LET OI=1
6220 IF O$="N" THEN LET OI=0
6230 IF O$="Y" OR O$="N" THEN GO
TO 5
6240 GOTO 6180
```



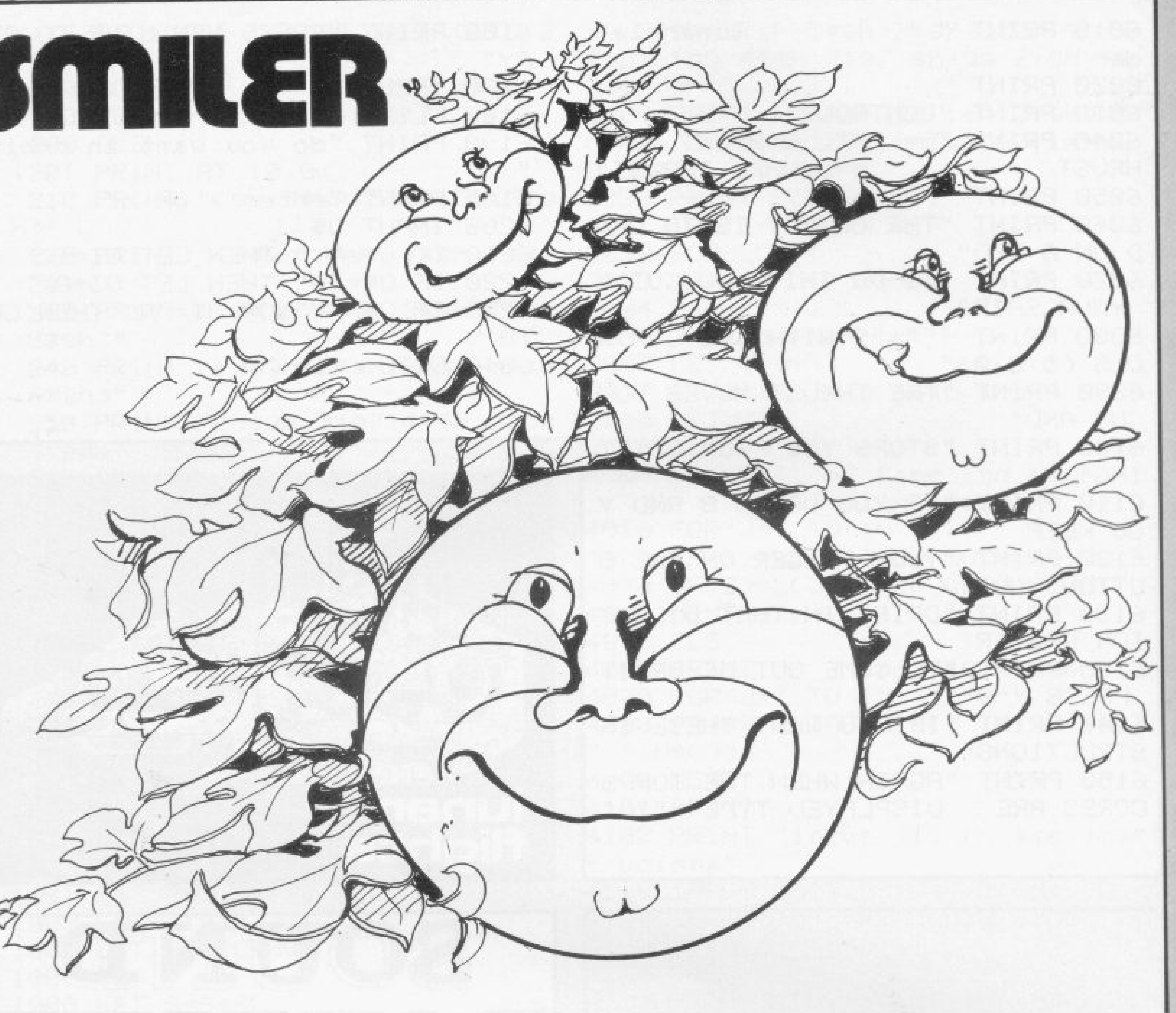
SOUND ROUTINE



THIS SHORT machine code routine can be included within programs on a 16 or 48K Spectrum. It will produce 190 sounds of varying lengths. Written by John Plunkett of Wetherby, West Yorkshire.

```
  10 CLEAR 32000
  20 FOR n=1 TO 15: READ a
  30 POKE 32000+n,a: NEXT n
  40 DATA 6,255,33,0,14,17,10,0,
43,205,181,3,16,250,201
  50 PRINT "ENTER SOUND LENGTH (
10 TO 200)"
  60 INPUT a
  70 POKE 32005,a
  80 RANDOMIZE USR 32001
```

SMILER



LEAD SMILER around the screen with the usual cursor keys. He must avoid the trees and eat the green squares. Once he has eaten four green squares he becomes supercharged and can eat as many trees as possible until his time (marked on the top right) runs out. If **Smiler** eats the inverse c while supercharged you gain 10 bonus points for every unit of time remaining.

A game for the 16K Spectrum by Redvers Stringer, Margate, Kent.

```
  10 BORDER 3
  50 LET L=0
  60 GO SUB 5000
  70 FOR n=1 TO 19: LET A=INT (R
ND*6): PRINT ; INK A;TAB 8*n;"bS
MILERb": NEXT n
  90 BEEP .2,7: BEEP .15,7: BEEP
 .1,8: BEEP .1,7: BEEP .1,12: BE
EP .1,11: BEEP .1,9: BEEP .3,7:
BEEP .2,5: BEEP .1,5: BEEP .2,4:
 BEEP .1,4: BEEP .1,2: BEEP .1,
0: BEEP .1,2: BEEP .3,4
  95 PAUSE 200: CLS
 100 LET V=3: LET S=0: LET J=S:
LET X=10: LET Y=15
 120 PRINT AT 0,13;"b b  "
 125 LET G=INT (RND*18)+2: LET H
=INT (RND*30)+1
 130 FOR A=1 TO 6: PRINT AT INT
(RND*18)+2,INT (RND*30)+1; INK 4
;"a": NEXT A: PAUSE 50
 135 LET R=0: LET J=0: LET Z=90

 137 GO SUB 8000
 140 PRINT AT INT (RND*18)+2,INT
(RND*30)+1; INK 2;"c"
 145 PRINT AT X,Y;" "
 150 IF R=10 THEN PRINT AT G,H;"
 ": LET G=INT (RND*17)+3: LET H=
INT (RND*28)+2: LET R=0
 165 IF J<400 THEN PRINT AT X,Y;
"b"
 167 PRINT AT X,Y;" "
 170 LET X=X+(INKEY$="6")-(INKEY
$="7")+(X<2)-(X>20)
```

```
 180 LET Y=Y+(INKEY$="8")-(INKEY
$="5")+(Y<1)-(Y>30)
 190 IF Z<=89 THEN GO TO 1000
 200 IF J=400 THEN BEEP .2,14: B
EEP .2,12: BEEP .2,11: BEEP .2,9
: BEEP .8,7: GO TO 1000
 220 IF ATTR (X,Y)=58 THEN GO TO
 7000

 230 IF ATTR (X,Y)=60 THEN LET S
=S+100: LET J=J+100
 250 PRINT AT 0,0;"SCORE= ";S

 260 PRINT AT G,H;"i©"

 300 IF J<400 AND X=G AND Y=H TH
EN LET R=10: GO TO 7000
 320 IF J>=400 AND X=G AND Y=H T
HEN PRINT AT 1,10;"BONUS TIME":
FOR F=10 TO 20: BEEP .1,F: NEXT
F: GO TO 900
 600 IF J<400 THEN PRINT AT X,Y;
"b"
 620 LET R=R+1
 700 IF J>=400 THEN PRINT AT X,Y
;"b"
 800 GO TO 140

 900 LET Z=Z-1: GO SUB 8600
 910 IF Z<=1 THEN PRINT AT 1,10;
"          ": LET R=10: GO TO 1
40
 920 LET S=S+10
 930 PRINT AT 0,0;"SCORE= ";S
 940 GO TO 900
1000 IF ATTR (X,Y)=58 THEN GO TO
 2000
1010 LET Z=Z-1: GO SUB 8600

1020 IF Z=0 THEN GO TO 130
1030 GO TO 240

2000 LET Z=Z-1: LET S=S+20: GO S
UB 8600
2010 IF Z=0 THEN GO TO 130
2020 GO TO 240
5000 FOR F=0 TO 7: READ X: POKE
USR "A"+F,X: NEXT F

5100 DATA BIN 00011000,BIN 00111
100,BIN 01111110,BIN 11100111,BI
N 11100111,BIN 01111110,BIN 0011

1100,BIN 00011000
5200 FOR F=0 TO 7: READ X: POKE
USR "B"+F,X: NEXT F

5300  DATA BIN 01100110,BIN 0110
0110,BIN 0,BIN 0,BIN 11000011,BI
N 01100110,BIN 00111100,BIN 0001
1000
5400 FOR F=0 TO 7: READ X: POKE
USR "C"+F,X: NEXT F
5500 DATA BIN 00011000,BIN 00111
100,BIN 01111110,BIN 11111111,BI
N 11111111,BIN 00011000,BIN 0001
1000,BIN 00111100
5600 FOR F=0 TO 7: READ X: POKE
USR "D"+F,X: NEXT F
5700 DATA BIN 10010010,BIN 01010

100,BIN 0,BIN 11000110,BIN 0,BIN

 01010100,BIN 10010010,BIN 0
6000 RETURN
7000 PRINT AT X,Y;"d"
7100 BEEP .5,4: BEEP .5,6: BEEP
.25,7: BEEP .25,6: BEEP .5,4
7200 LET V=V-1
7205 IF V=2 THEN PRINT AT 0,13;"
b "

7210 IF V=0 THEN GO TO 7300
7215 IF V=1 THEN PRINT AT 0,13;"
"
7220 GO TO 140
7400 IF S>L THEN LET L=S
7500 CLS : PRINT AT 3,2;"YOUR SC

ORE ";S;AT 5,2;"HI SCORE  ";L;A
T 17,0;"DO YOU WISH TO PLAY AGAI
N (N/Y)": PRINT AT 9,9;"GAME OVE
R";AT 10,9;"GAME OVER"

7515 PAUSE 30
7517 IF INKEY$="y" THEN CLS : GO
 TO 100
7520 IF INKEY$="Y" THEN CLS : GO
 TO 100
7530 IF INKEY$="N" THEN CLS : PR
INT AT 10,13;"GOOD BYE": STOP

7540 IF INKEY$="n" THEN CLS : PR
INT AT 10,13;"GOOD BYE": STOP
7550 GO TO 7517

8500 LET Q=0
8520 PLOT 163+Q,175: DRAW 0,-7

8530 LET A=INT (RND*30): BEEP .0
08,A
8540 LET Q=Q+1

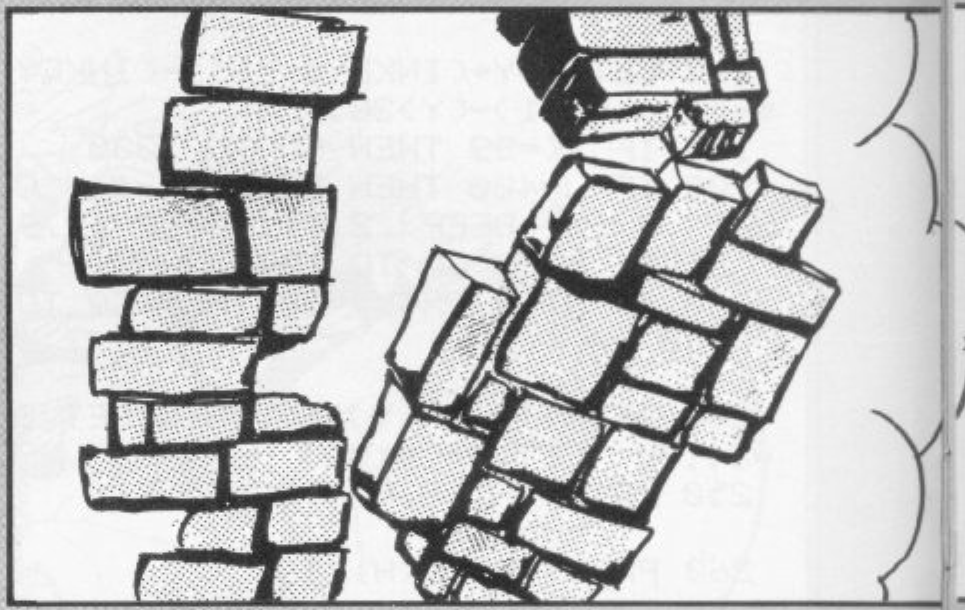
8560 IF Q=90 THEN RETURN
8590 GO TO 8520

8600 PLOT 163+Z,175: DRAW OVER 1
;0,-6: RETURN
```

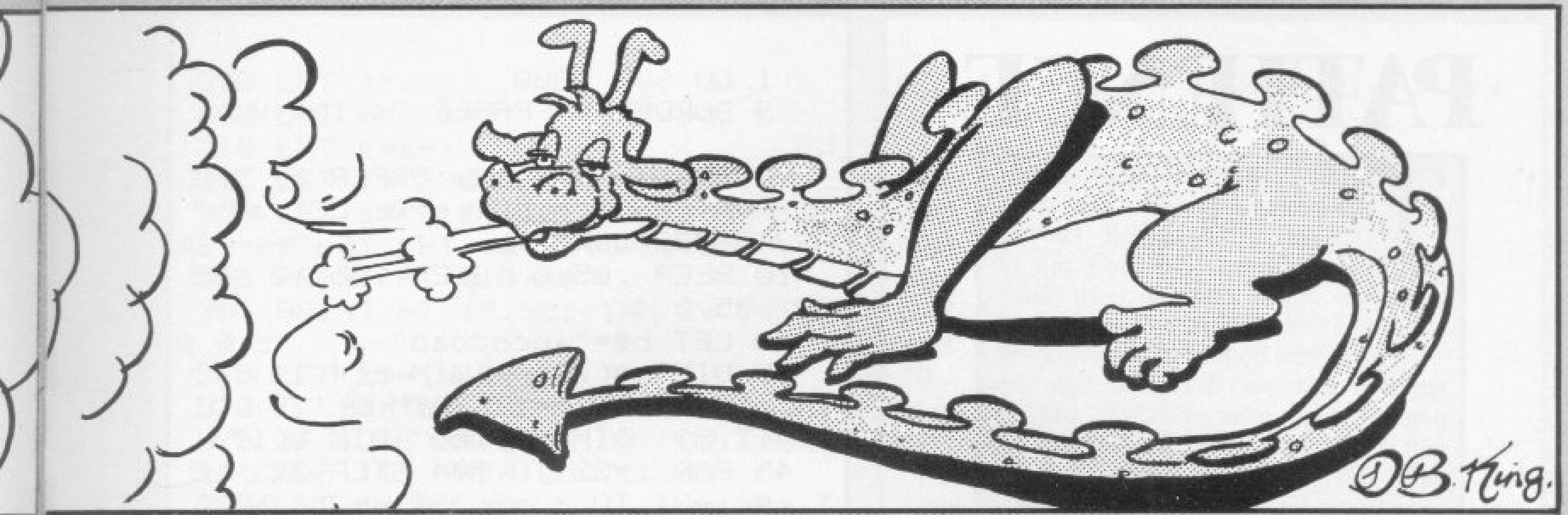
DRAGON ATTACK

SHARK CASTLE is being attacked by a group of marauding dragons. Each time a dragon hits the castle the crack in its wall will grow larger. Try to shoot down all the dragons before they can destroy your home. Move left with 'O', right with 'P' and fire with 'A'.

Created for the 16K Spectrum by Shaun Ward of Plymouth, Devon.



```
10 LET z=23: LET sc=0: LET sh=0: LET lv=3
20 GO SUB 5020: GO TO 1000
30 FOR n=14 TO 2 STEP -1: LET y=y+1: PRINT INK i;AT x,y-1;" AB "
40 PRINT INK i;AT n,lr+1;"|";AT n+1,lr+1;" ": BEEP .004,n: BEEP .005,n+5
50 IF y>16 THEN LET y=0: PRINT AT x,16;"   ": LET z=z+1: PRINT AT 12,z;" ": IF z=31 THEN GO TO 250
55 IF SCREEN$ (n-1,lr+1)<>" " THEN GO TO 170
60 NEXT n: PRINT AT 2,lr+1;" "
70 RETURN
80 FOR n=19 TO 21: PRINT AT 16,lr;"   "; INK 5; PAPER 1;AT n,lr;"E";AT n-1,lr;" ": BEEP .5,-n: NEXT n
90 LET z=23: CLS : OVER 1: BRIGHT 1: FOR n=0 TO 21: PAPER (RND*5+1): PRINT AT n,0,,: BEEP .01,n: NEXT n
100 PRINT INK 9;AT 7,12;"SCORE:";AT 9,12;"LIVES:";AT 11,12;"SHEETS:";AT 7,18;sc;AT 9,18;lv;AT 11,19;sh
110 OVER 0: BRIGHT 0: FOR n=1 TO 500: NEXT n: RETURN
120 FOR n=1 TO 16: LET y=y+1: PRINT INK i;AT x,y-1;" AB "
130 IF y>16 THEN LET y=0: PRINT AT x,16;"    "
170 PRINT INK i;AT x,y-1;"***": BEEP .1,x: PRINT INK i;AT x-1,y;"*": BEEP .1,-x: PRINT AT x,y-1;"   ";AT x-1,y;" ": LET y=0: LET sc=sc+10
180 PRINT AT x+1,lr+1;" "
190 LET x=x-1: GO TO 3040
200 PRINT AT 16,lr+1;" ": FOR n=19 TO 21: PRINT PAPER 1;AT n,lr; INK 6;"F";AT n-1,lr; PAPER 1;" ": BEEP .5,-n: NEXT n: PRINT PAPER 1;AT 21,lr;" "
230 IF lv=0 THEN GO TO 0
240 RETURN
250 FOR n=19 TO 22: BEEP .3,n: PRINT AT 17,n; INK i;"F": NEXT n
270 LET a$="YOUR CASTLE HAS HAD IT": FOR n=1 TO LEN a$: PRINT INK (RND*5+1);AT 16,n;a$(n TO n): BEEP .1,n: NEXT n
280 LET lv=lv-1: LET sh=sh+1: GO SUB 90: LET z=23: GO TO 2040
1000 LET x=144
1010 FOR n=0 TO 7: READ a: POKE USR (CHR$ x)+n,a: NEXT n: LET x=x+1
1020 IF x>149 THEN GO TO 2040
1030 GO TO 1010
1040 DATA 64,229,255,127,63,96,64,160
1060 DATA 16,104,252,214,139,196,32,80
1070 DATA 28,28,8,252,10,13,10,24
2010 DATA 255,129,153,157,255,255,255,255
2020 DATA 24,24,31,48,48,72,136,204
2030 DATA 255,129,129,129,129,129,129,255
2040 IF lv<1 THEN GO TO 4050
2045 LET sh=sh+1: PAPER 0: BORDER 0: CLS
2060 FOR n=17 TO 21: PRINT INK 3;AT n,0;"FFFFFFFFFFFFFFFFFFF": BEEP .01,n: NEXT n
2070 FOR n=17 TO 21: PRINT INK 3;AT n,23;"FFFFFFFF": BEEP .01,n: NEXT n
```



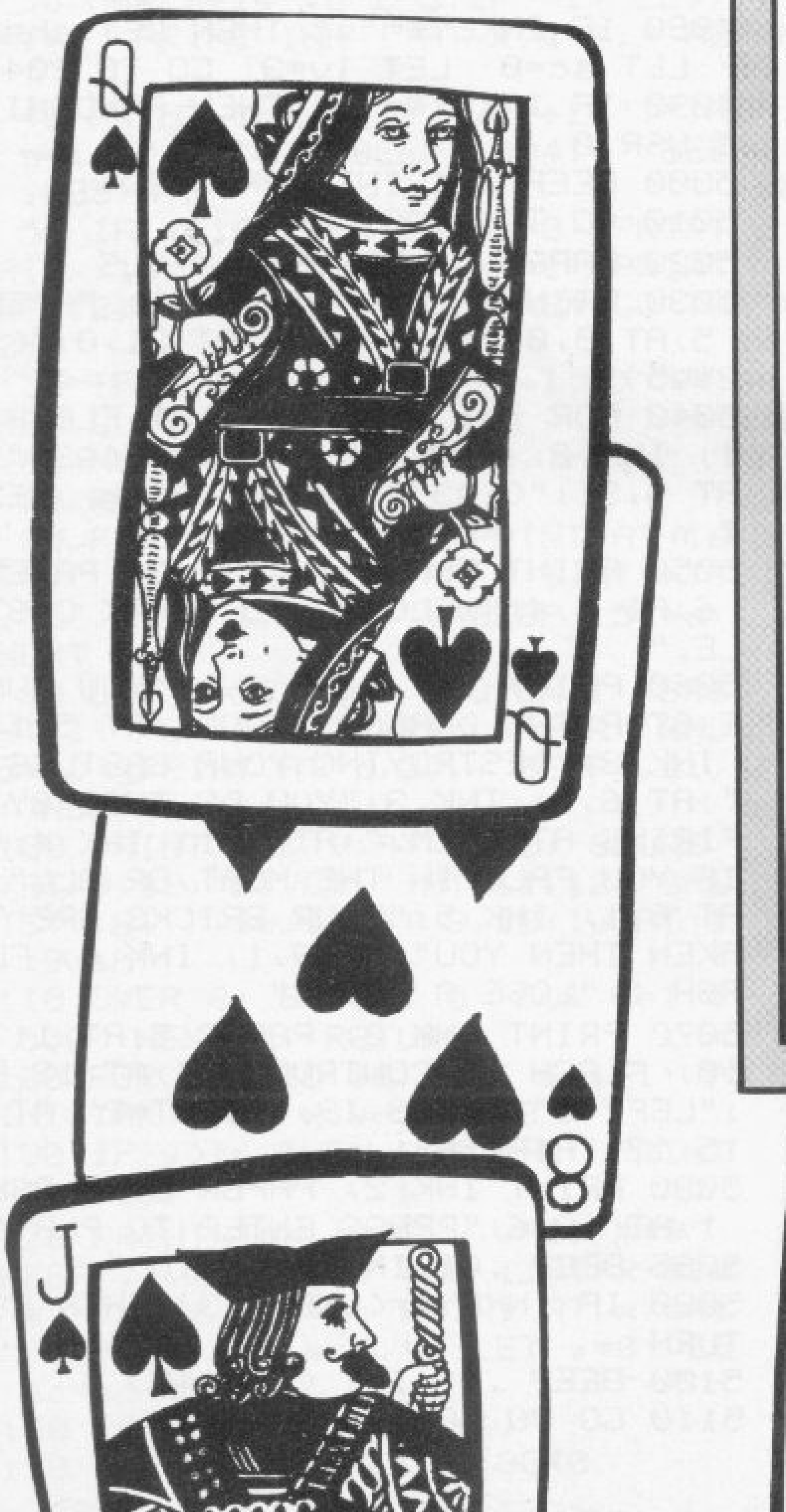
```
2080 FOR a=24 TO 31: FOR n=16 TO
 7 STEP -1: PRINT INK 5;AT n,a;"
F": NEXT n: BEEP .01,a: NEXT a:
PRINT AT 6,23; INK 5;"FFFFFFFFF"
;AT 5,22;"FFFFFFFFFF"
2090 PRINT INK 5;AT 4,21;"F F F
F F F";AT 3,21; INK 6;" ";AT 2,2
1;" ";AT 2,20; INK 2; PAPER 5; F
LASH 1;"D"
3000 FOR n=18 TO 21: PRINT INK 1
;AT n,19;"(4*isP)": BEEP .5,n: N
EXT n
3010 PRINT INK (RND*5+1); PAPER
9; FLASH 1;AT 0,0;"(96:93:96:93:
96) KILLER-SHARK CASTLE (i96:93:
i96:93:i96)"
3020 LET y=1
3030 LET lr=4
3040 LET x=INT (RND*9+2): LET i=
INT (RND*5+1)
3045 IF z>30 THEN GO TO 250
3046 PRINT AT 12,z;" "
3050 LET lr=lr+(IN 57342=254 OR
lr<1)-(IN 57342=253)
3060 IF lr>18 THEN LET lv=lv-1:
GO SUB 80: GO TO 2040
3070 PRINT INK 5;AT 16,lr;" E "
3080 PRINT INK i;AT x,y; INK 5;"
 AB ": BEEP .002,x
3090 LET y=y+1
4000 IF y>16 THEN LET y=0: LET z
=z+1: PRINT AT x,16;"   ": GO TO
 3040
4010 IF IN 65022=254 THEN GO SUB
.30
4020 PRINT PAPER i; INK 9;AT 17,
0;"SCORE:";sc
4040 GO TO 3050
4050 BORDER (RND/5): PAPER 0: CL
S
4060 PRINT AT 0,0; INK RND*5;"SC
ORE:";sc;AT 0,13;"HIGH-SCORE:";h
$
4070 PRINT AT 10,7; FLASH 1; INK
 RND*5; PAPER 9;"ANOTHER GO? (Y/
N)"
4080 IF INKEY$="y" THEN LET sh=0
: LET sc=0: LET lv=3: GO TO 2045
4090 IF INKEY$="n" THEN RANDOMIZ
E USR 0
5000 BEEP .01,INT (RND*50)
5010 GO TO 4080
5020 PAPER 1: BORDER 1: CLS
5030 PRINT FLASH 1; INK 2; PAPER
 5;AT 0,0;"(32*i95)";AT 21,0;"(3
2*95)"
5040 FOR n=1 TO 20: PRINT FLASH
1; INK 2; PAPER 0;AT n,0;"(93)";
AT n,31;"(i93)": BEEP .01,n: NEX
T n
5050 PRINT FLASH 1; INK 3; PAPER
 6;AT 2,4;"WELCOME TO SHARK CAST
LE."
5060 PRINT INK 3;AT 4,1;"YOU MUS
T STOP THE DRAGONS FROM";AT 5,1;
 INK 2;"DESTROYING YOUR CASTLES.
";AT 6,1; INK 3;"YOU DO THIS BY
FIRING AT THEM.";AT 7,1; INK 4;"
IF YOU FALL IN THE MOAT,OR ALL";
AT 8,1; INK 5;"YOUR BRICKS ARE T
AKEN THEN YOU";AT 9,1; INK 6; FL
ASH 1;"LOSE A LIFE."
5070 PRINT INK 0; PAPER 5;AT 11,
10; FLASH 1;"CONTROLS:-";AT 13,5
;"LEFT=O";AT 13,19;"RIGHT=P";AT
15,12;"FIRE=A"
5080 PRINT INK 2; PAPER 6; FLASH
 1;AT 18,6;"PRESS ENTER TO PLAY"
5085 BEEP .01,INT (RND*10)
5090 IF INKEY$=(CHR$ 13) THEN RE
TURN
5100 BEEP .01,INT (RND*40)
5110 GO TO 5085
```

PATIENCE

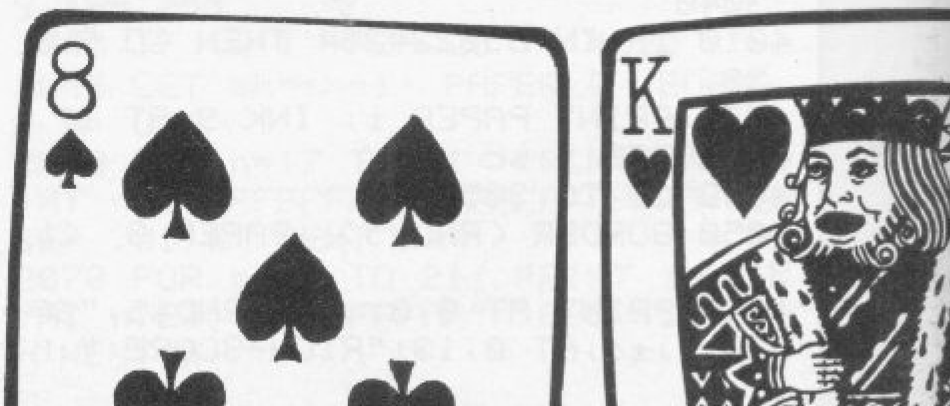
THIRTY-FIVE CARDS are arranged in seven rows of five on the left of the screen. On the right is an upturned card and a pile of cards face down. The aim is to finish with the 35 cards piled on the right.

A card at the bottom of a row may be removed and placed on the right by pressing the number of its row, so long as it is next in number to the card on the right. Thus a five or a seven may be placed on a six, a queen on a king, or a two on an ace. If no other move is possible, another of the cards on the right can be upturned by pressing "S".

Patience was written for the 16K Spectrum by Andrew Price of West Bromwich, West Midlands.



```
   1 GO SUB 9000
   3 BORDER 0: PAPER 7: INK 0: C
LS
   4 PRINT AT 8,12; PAPER 6; INK
 2;"PATIENCE": LET e=0: LET a$="
A23456789TJQK"
  10 BEEP .05,0: BEEP .05,10: BE
EP .05,0
  13 LET b$="abcdcbad"
  15 DIM s$(704): DIM c(4,13): D
IM n(7): LET z=17: DIM v(17): DI
M p(7,5): DIM q(7,5): DIM w(17)
  45 FOR i=32 TO 704 STEP 32: LE
T s$(i-31 TO i)="(32*isP)": NEXT
 i
  60 FOR i=1 TO 17
  62 BEEP .05,0
  65 GO SUB 1e3
  70 LET v(i)=s: LET w(i)=t: LET
 s$(32*i+34 TO 32*i+60)="(3*sP:i
sP:3*sP:isP:3*sP:isP:3*sP:isP:3*
sP:isP:3*sP:isP:3*sP)": NEXT i
  95 FOR i=4 TO 13 STEP 3: LET s
$(32*i+2 TO 32*i+28)="(3*i93:isP
:3*i93:isP:3*i93:isP:3*i93:isP:3
*i93:isP:3*i93:isP:3*i93)": NEXT
 i
 105 FOR i=286 TO 414 STEP 32: L
ET s$(i TO i+2)="   ": LET s$(i+
288 TO i+290)="(3*96)": NEXT i
 125 FOR i=1 TO 7
 130 FOR j=1 TO 5
 132 BEEP .05,2
 135 GO SUB 1e3
 140 LET p(i,j)=s: LET q(i,j)=t:
 LET s$(j*96+i*4-34)=a$(q(i,j))
 155 LET s$(j*96+i*4-2)=b$(p(i,j
))
 160 NEXT j
 162 BEEP .05,4
 170 LET s$(i*4+639)=CHR$ (48+i)
: LET s$(576+i*4)=a$(q(i,5)): LE
T s$(544+i*4)=b$(p(i,5))
 190 NEXT i
 195 LET s$(255)="F": LET s$(543
)="s"
```

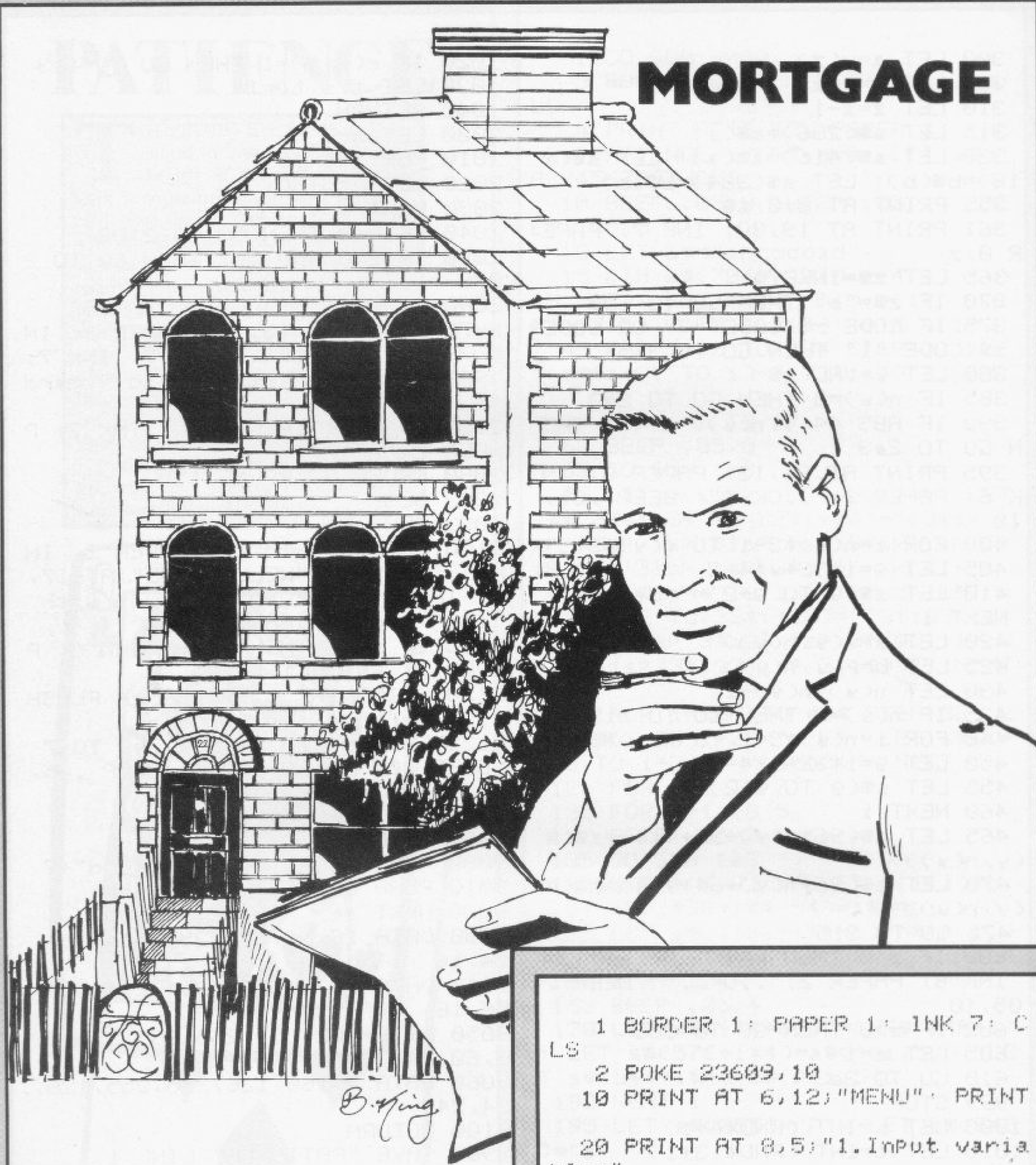


```
 300 LET a=w(z)
 305 LET b=v(z)
 310 LET z=z-1
 315 LET s$(286)=a$(a)
 320 LET s$(416)=a$(a): LET s$(3
18)=b$(b): LET s$(384)=b$(b)
 355 PRINT AT 0,0;s$
 361 PRINT AT 19,30; INK 7; PAPE
R 0;z
 365 LET z$=INKEY$
 370 IF z$="s" THEN GO TO 600
 375 IF CODE z$>CODE "7" OR CODE
 z$<CODE "1" THEN GO TO 365
 380 LET y=VAL z$
 385 IF n(y)=0 THEN GO TO 2e3
 390 IF ABS (q(y,n(y))-a)<>1 THE
N GO TO 2e3
 395 PRINT AT 21,13; PAPER 0; IN
K 6; PAPER 2;"..OK..": BEEP .05,
10
 400 FOR i=n(y)*3-1 TO n(y)*3+3
 405 LET g=i*32+y*4-2
 410 LET s$(g TO g+2)="(3*1sP)":
 NEXT i
 420 LET a=q(y,n(y))
 425 LET b=p(y,n(y))
 430 LET n(y)=n(y)-1
 435 IF n(y)=0 THEN GO TO 315
 440 FOR i=n(y)*3+1 TO n(y)*3+3
 450 LET g=i*32+y*4-2
 455 LET s$(g TO g+2)="   "
 460 NEXT i
 465 LET s$(96*n(y)+96+y*4)=a$(q
(y,n(y)))
 470 LET s$(96*n(y)+64+y*4)=b$(p
(y,n(y)))
 475 GO TO 315
 600 IF z>0 THEN PRINT AT 21,13;
 INK 6; PAPER 2;"..OK..": BEEP .
05,10
 602 IF z>0 THEN GO TO 300
 605 LET e=1
 610 GO TO 2e3
 999 STOP
1000 LET s=INT (RND*4+1)
1010 LET t=INT (RND*13+1)
```

```
1020 IF c(s,t)=1 THEN GO TO 1e3
1030 LET c(s,t)=1
1040 RETURN
2000 LET o=0
2010 FOR i=1 TO 7
2020 LET o=o+n(i)
2030 NEXT i
2040 IF o=0 THEN GO TO 2100
2050 IF z=0 AND e=1 THEN GO TO 2
070
2060 GO TO 350
2070 PRINT AT 15,12; PAPER 2; IN
K 7;"HARD  LUCK";AT 17,7; INK 7;
 PAPER 2;"You lost by ";o;" card
";
2080 IF o<>1 THEN PRINT INK 7; P
APER 2;"s"
2090 PAUSE 0: PAUSE 150
2092 CLS
2093 RUN
2100 PRINT AT 15,12; PAPER 2; IN
K 6; FLASH 1;"WELL  DONE";AT 17,
0; INK 6; PAPER 2;"You won with
";z;" stock card";
2110 IF z<>1 THEN PRINT INK 6; P
APER 2; FLASH 1;"s"
2120 PRINT INK 6; PAPER 2; FLASH
 1;" left"
2125 FOR m=1 TO 2: FOR n=0 TO 7:
 BEEP .05,n: BORDER n: BEEP .05,
-n: NEXT n: NEXT m
2130 GO TO 2090
8999 STOP
9000 FOR a=USR "a" TO USR "d"+7
9010 READ user: POKE a,user
9020 NEXT a
9030 DATA 16,56,124,254,254,254,
84,16
9040 DATA 16,56,124,254,254,124,
56,16
9050 DATA 102,231,255,255,255,12
6,60,24
9060 DATA 24,60,126,255,255,126,
24,24
9106 RETURN
9900 SAVE "PATIENCE" LINE 1
```



MORTGAGE



ENTER the principal of the mortgage you wish to calculate, the interest rate, and the number of years over which it must be repaid. The computer will then calculate your monthly repayments for that time, the amount of money remaining to be repaid each month, and will draw a graph of payments.

Mortgage was written for the 48K Spectrum by D Barton of Keighley, West Yorkshire.

```
   1 BORDER 1: PAPER 1: INK 7: C
LS
   2 POKE 23609,10
  10 PRINT AT 6,12;"MENU": PRINT
  20 PRINT AT 8,5;"1.Input varia
bles"
  30 PRINT AT 10,5;"2.Mortgage C
alculation"
  40 PRINT AT 12,5;"3.Graph Of R
esults"
  50 PRINT AT 15,2;"Input Code N
umber To Continue";AT 16,5;"(OP1
 must be completed             be
fore OPs2 and 3)"
  60 INPUT P$
  70 IF P$<>"1" AND P$<>"2" AND
P$<>"3" THEN GO TO 60
  80 CLS
```

```
 90 IF P$="1" THEN GO TO 120
 100 IF P$="2" THEN GO TO 250
 110 IF P$="3" THEN GO TO 550
 120 PRINT AT 6,2;"Enter Princip
le               :"
 130 INPUT a: PRINT AT 7,3;"£";a
 140 PRINT AT 9,2;"Enter current
 Interest rate        :"
 150 INPUT e: PRINT AT 10,3;e;"%
"
 160 PRINT AT 12,2;"Enter number
 of years             :"
 170 INPUT n: PRINT AT 13,3;n;".
years"
 180 LET h=((e/100)+1)^n
 190 LET j=(1/h)-1
 200 LET k=(j/(-e/100))/a
 210 LET c=(1/k)/12
 220 LET b=a*(e/100)
 230 LET x=a+b
 240 PAUSE 50: CLS : GO TO 10
 250 PRINT "--------------------
-----------"
 260 PRINT " Year 1": PRINT
 270 PRINT TAB 8;"Balance - £ ";
TAB 25-LEN STR$ a;a
 280 PRINT TAB 8;"Interest- £ ";
TAB 25-LEN STR$ INT b;b
 290 PRINT TAB 18;"-------"
 300 PRINT TAB 18;"£ ";TAB 25-LE
N STR$ INT x;x
 310 PRINT
 320 FOR g=1 TO n
 330 FOR m=1 TO 12
 340 IF INKEY$<>"" THEN PAUSE 30
0
 350 PRINT TAB 6-LEN STR$ m;m;TA
B 8;"£ ";INT (c*100)/100;TAB 18;
"\ ";TAB 25-LEN STR$ INT (x-c);I
NT ((x-c)*100)/100
 360 LET x=x-c
 370 IF x<=0 THEN INPUT P$: CLS
: PAUSE 50: GO TO 10
 380 NEXT m
 390 LET z=(e/100)*x
 400 LET y=x+z
 410 PRINT
 420 PRINT "--------------------
-----------"
 430 PRINT "--------------------
-----------"
 440 PRINT " Year ";g+1: PRINT
 450 PRINT TAB 8;"Balance - £ ";
TAB 25-LEN STR$ INT x;INT (x*100
)/100
 460 PRINT TAB 8;"Interest- £ ";
TAB 25-LEN STR$ INT z;INT (z*100
)/100
 470 PRINT TAB 18;"----------"
 480 PRINT TAB 18;"£ ";TAB 25-LE
N STR$ INT y;INT (y*100)/100
 490 PRINT
 500 LET x=y
 510 NEXT g
 520 CLS
 530 GO TO 10
 540 REM graph
 550 DIM y$(21)
 560 LET y$="||||| Pounds ||||||
||"
 570 FOR i=1 TO LEN y$
 580 PRINT AT i,0;y$(i)
 590 NEXT i
 600 PRINT AT 21,0;"-----------
Years -----------"
 610 LET b=a*(e/100)
 620 LET l=8
 630 LET x=a+b
 640 LET z=x*(1+(e/100))
 650 IF z<8000 THEN LET q=46
 660 IF z>=8000 AND z<14000 THEN
 LET q=80
 670 IF z>=14000 AND z<20000 THE
N LET q=120
 680 IF z>=20000 AND z<26000 THE
N LET q=150
 690 IF z>=26000 AND z<32000 THE
N LET q=185
 700 FOR g=1 TO n
 710 FOR m=1 TO 12
 720 IF INKEY$<>"" THEN PAUSE 30
0
 730 LET l=l+.75
 740 PRINT AT 1,4;"£ ";TAB 11-LE
N STR$ INT x;INT (x*100)/100
 750 PLOT l,x/q
 760 LET x=x-c
 770 IF x<=0 THEN GO TO 830
 780 NEXT m
 790 LET z=(e/100)*x
 800 LET y=x+z
 810 LET x=y
 820 NEXT g
 830 PRINT AT 1,4;"
"
 840 PRINT AT 4,16;"Years:";n;AT
 5,17;"Loan:>";a;AT 6,18;"Int:";
e;AT 6,24;"%"
 850 INPUT "Copy? Y/N ";P$
 860 IF P$="Y" OR P$="y" THEN PR
INT AT 1,4;"          "
 870 IF P$="Y" OR P$="y" THEN CO
PY
 880 CLS
 890 GO TO 10
```

THIRTY ONES

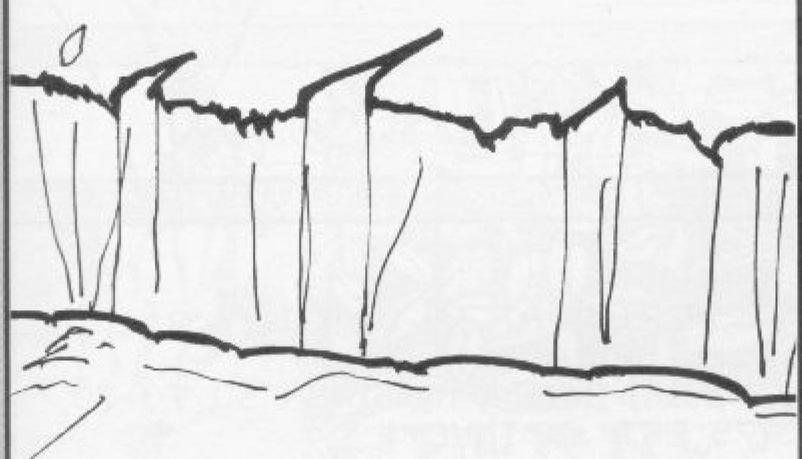
WHEN START? is displayed enter M if you wish to play first or Y if you would prefer the computer to start. A set of counters will then be displayed, four of each number from one to six. You and the computer take turns in removing a number to add to the total. The winner is the player who brings the total to 31.

Written for the 16K ZX-81 by J. H. Entwistle of Cheltenham, Gloucestershire.



```
  8 CLS
  9 PRINT "START?"
 10 INPUT A$
 11 LET R=31
 12 LET M=7
 13 DIM D(6,4)
 14 LET T=0
 15 CLS
 19 FOR N=1 TO 6
 20 PRINT N*1111
 30 NEXT N
 35 PRINT AT 9,0;"TARGET= 31"
 40 IF A$(1)="Y" THEN GOTO 220
100 PRINT AT 18,0;"NUMBER?"
110 INPUT N
111 LET N=INT ABS N
112 IF NOT N OR N>M-1 THEN GOTO
110
113 PRINT AT 18,0;"          "
120 FOR A=1 TO 4
130 IF D(N,A)=0 THEN GOTO 145
140 NEXT A
145 PRINT AT N-1,A-1;"."
150 LET D(N,A)=1
160 LET R=R-N
164 PRINT AT 9,0;"TARGET= 31"
165 PRINT AT 10,0;"TOTAL=";31-R
166 IF R=0 THEN GOTO 340
167 IF R<0 THEN GOTO 350
170 FOR N=1 TO 4
180 IF D(M-1,N)=0 THEN GOTO 220
190 NEXT N
200 LET M=M-1
210 GOTO 170
220 LET G=R-M*INT (R/M)
230 IF R/M=INT (R/M) THEN LET G
=1+INT (RND*(M-1))
240 FOR N=1 TO 4
250 IF D(G,N)=0 THEN GOTO 300
260 NEXT N
270 LET G=1+INT (RND*(M-1))
280 GOTO 240
300 PRINT AT G-1,N-1;"."
310 LET R=R-G
315 PRINT AT 10,0;"TOTAL=";31-R
316 IF R=0 THEN GOTO 350
317 IF R<0 THEN GOTO 340
320 LET D(G,N)=1
330 GOTO 100
340 LET T=1
350 IF T=1 THEN PRINT AT 12,0;"
YOU WIN."
360 IF T=0 THEN PRINT AT 12,0;"
I WIN."
370 PRINT "AGAIN?"
380 INPUT A$
390 IF A$(1)="Y" THEN RUN
400 STOP
```





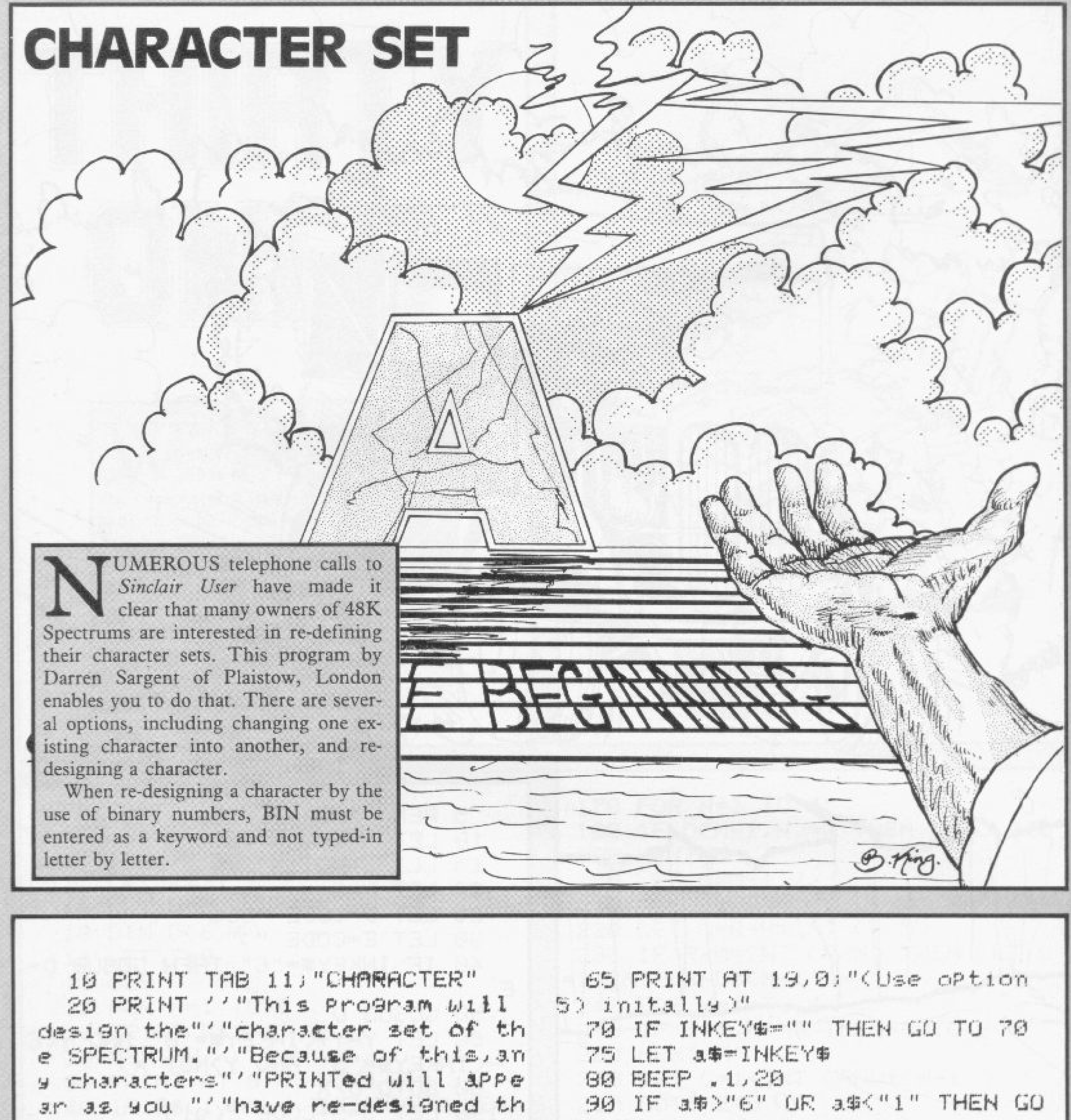
MAZE

AS YOU MOVE down the screen, steering with the usual cursor keys, a maze moves up towards you. How far can you move through it before your way is blocked or you crash into a wall?

Maze was written for the 1K ZX-81 by C Hopley of Liverpool.

```
   5 REM "MAZE"
  10 LET X=CODE "(95)"
  15 LET S=NOT X
  20 LET Y=S
  25 LET D=CODE "COS "
  30 LET E=CODE ">"
  40 IF INKEY$="6" THEN GOSUB D-
E
  50 GOSUB D
  60 LET Y=Y+(INKEY$="8" AND Y<E
)-(INKEY$="5" AND Y>NOT X)
  80 GOTO D/X
 190 LET S=S+CODE "(91)"
 191 PRINT AT CODE "=",NOT X;"(1
8*isp)"
 192 GOSUB D-X
 194 PRINT AT CODE "=",RND*E;"(i
sp)";AT CODE "<",RND*E;" ";AT CO
DE "<",RND*E;" "
 199 SCROLL
 200 PRINT AT X,Y;
 205 IF PEEK (PEEK 16398+PEEK 16
399*VAL "256")=CODE "(isp)" THEN
 GOTO CODE ">="
 210 PRINT AT X,Y;"(i*)";AT X,Y;
"*"
 215 RETURN
 220 PRINT "(i*)SCORE=";S-CODE "
(93)"
```

CHARACTER SET



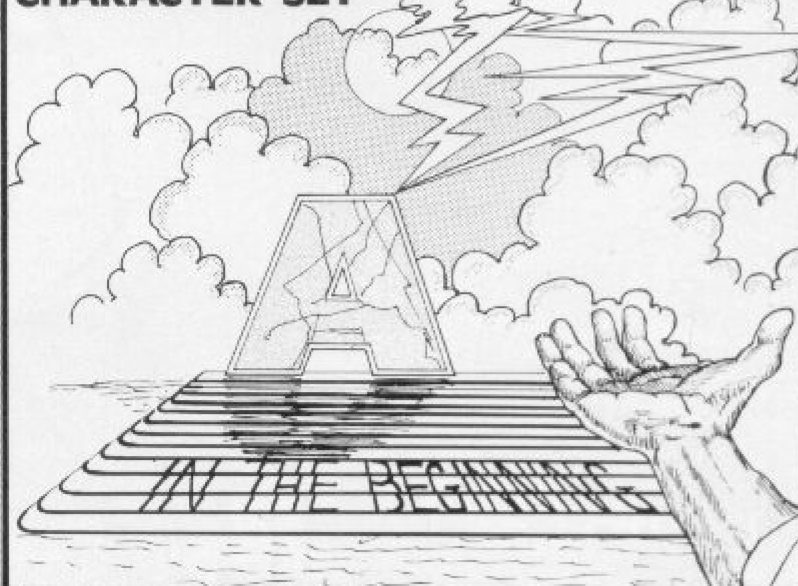
NUMEROUS telephone calls to *Sinclair User* have made it clear that many owners of 48K Spectrums are interested in re-defining their character sets. This program by Darren Sargent of Plaistow, London enables you to do that. There are several options, including changing one existing character into another, and re-designing a character.

When re-designing a character by the use of binary numbers, BIN must be entered as a keyword and not typed-in letter by letter.

```
  10 PRINT TAB 11;"CHARACTER"
  20 PRINT ''"This program will
design the"'"character set of th
e SPECTRUM."'"Because of this,an
y characters"'"PRINTed will appe
ar as you "'"have re-designed th
em."
  30 PRINT "Press ENTER to conti
nue.."
  40 IF INKEY$<>CHR$ 13 THEN GO
TO 40
  50 CLS : PRINT ''TAB 13;"MENU:
-":
  60 PRINT "1)Redesign a charact
er"'"2)Set a character to it's u
sual"'"Sinclair form"'"3)Change
a character into "'"another"'"4)
Go back to Sinclair charactersan
d exit from Program"'"5)Set up u
ser-defined chars."'"6)Print out
 charcter set"
  65 PRINT AT 19,0;"(Use option
5) initally)"
  70 IF INKEY$="" THEN GO TO 70
  75 LET a$=INKEY$
  80 BEEP .1,20
  90 IF a$>"6" OR a$<"1" THEN GO
 TO 70
  95 BEEP .2,VAL a$*2
  96 CLS
  97 GO TO (VAL a$*100)
 100 PRINT "Which character do y
ou wish to "'"redesign ?"
 105 INPUT c$: IF c$<" " OR c$>"
@" THEN GO TO 105
 107 LET x=8*(CODE c$-32)
 110 CLS : PRINT AT 0,0;"Redesig
ning '";c$;"'": FOR c=0 TO 7
 120 PRINT AT 2,0;"Enter data fo
r row ";c+1'"(You can use the fu
nction 'BIN')"
 130 INPUT d: IF d>255 OR d<0 TH
```

```
EN GO TO 120
 140 POKE 31831+c+x,d: NEXT c: G
O TO 700
 200 PRINT AT 0,0;"Which charact
er do you wish to"'"return to no
rmality?": INPUT c$: IF c$>"@" O
R c$<" " THEN GO TO 200
 205 LET x=8*(CODE c$-32)
 210 PRINT AT 11,16;c$
 220 FOR c=0 TO 7: POKE 31831+c+
x,PEEK (15616+c+x): NEXT c: GO T
O 700
 300 PRINT "Which character do y
ou wish to "'"change?";
 310 INPUT c$: IF c$<" " OR c$>"
@" THEN GO TO 310
 320 PRINT ''"What do you wish t
o change '";c$;"' into?"
 330 INPUT n$: IF n$>"@" OR n$<"
" THEN GO TO 330
 340 LET x=8*(CODE c$-32): LET y
=8*(CODE n$-32)
 350 FOR c=0 TO 7: POKE 31831+c+
x,PEEK (15616+c+y): NEXT c: GO T
O 700
 400 POKE 23606,0: POKE 23607,60
: PRINT TAB 12; FLASH 1;"Goodbye
": STOP
 500 CLEAR 31574: PRINT AT 0,0;
FLASH 1;"Nothing's Wrong!!"
 510 FOR c=0 TO 767: POKE 31831+
c,PEEK (15616+c): NEXT c: LET a=
31831-256: LET b=INT (a/256): LE
T c=a-b*256: POKE 23606,c: POKE
23607,b: GO TO 700
 600 FOR c=32 TO 255: PRINT CHR$
c;: NEXT c: GO TO 700
 700 PRINT AT 1,0;£1;"Press any
key to return to menu": PAUSE 0:
 GO TO 50
```

CHARACTER SET

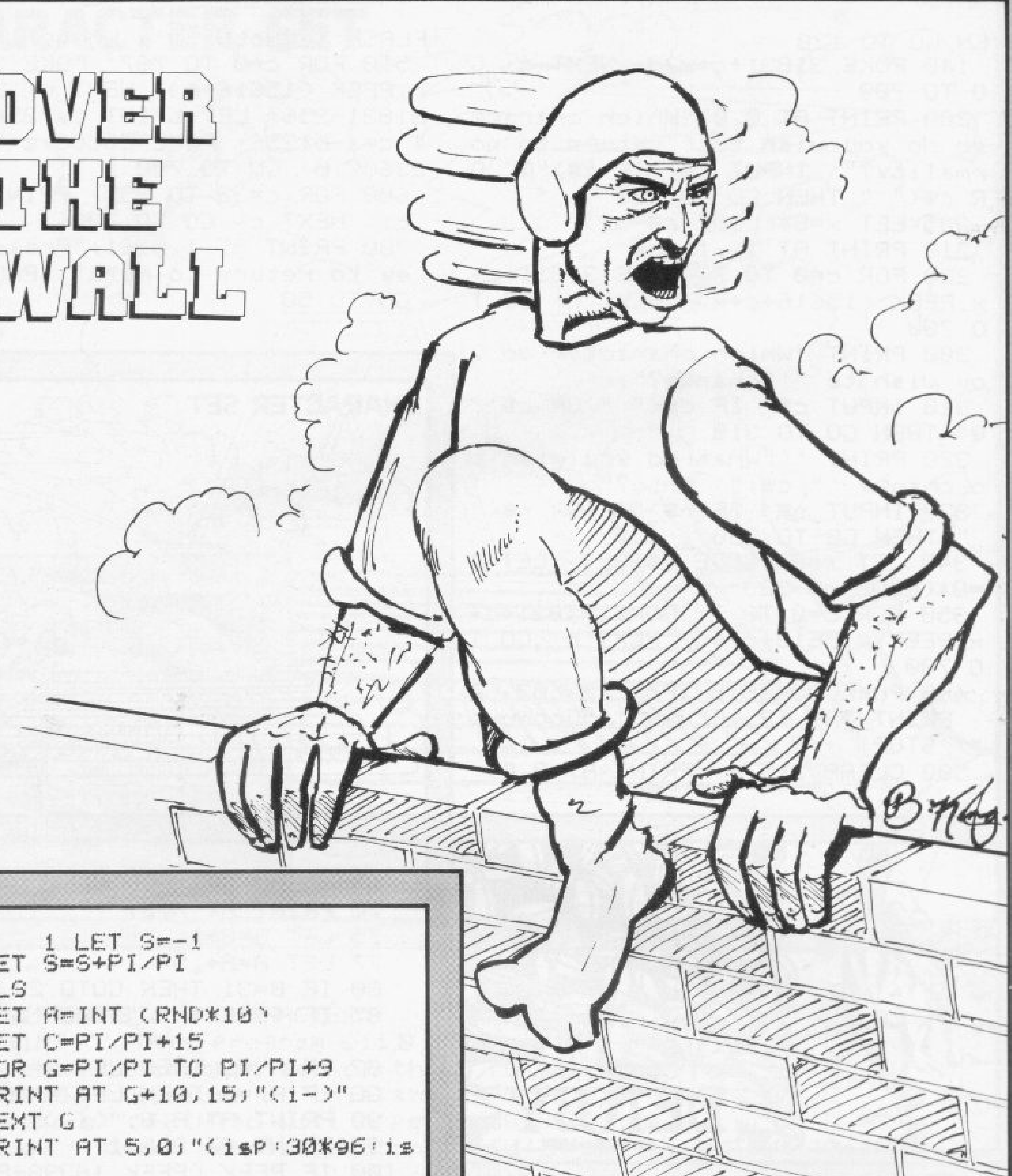




CLEAR THE hurdles in front of you by pressing "J" to jump. Remember that jumping is tiring so that the longer and more frequent your jumps, the smaller your chance of clearing the next hurdle. Your score will be given when you fail to jump a hurdle. For the 16K ZX-81 by Bruce Harkins of Stewarton, Ayrshire.

```
  15 LET T=0
  20 CLS
  21 LET Z=0
  25 LET A=9
  28 LET B=0
  30 FOR N=0 TO 31
  40 PRINT AT 10,N;"(gf)"
  50 NEXT N
  60 GOSUB 300
  70 PRINT AT A,B;" "
  75 LET B=B+1
  77 LET A=A+.5
  80 IF B=31 THEN GOTO 20
  85 IF INKEY$="J" THEN GOSUB 40
0
  87 IF A<=8 THEN LET A=8
  88 IF A>=9 THEN LET A=9
  90 PRINT AT A,B;"(i>)"
  95 PRINT AT A,B+1;
 100 IF PEEK (PEEK 16398+PEEK 16
399*256)=128 THEN GOTO 200
 105 LET T=T+1
 110 GOTO 70
 200 PRINT T
 210 PAUSE 50
 220 GOTO 1
 300 FOR D=1 TO 3
 305 LET F=INT (RND*27)+5
 310 PRINT AT 9,F;"(isp)"
 320 NEXT D
 330 RETURN
 410 LET Z=Z+1
 420 IF Z>=10 THEN RETURN
 430 LET A=A-1
 440 RETURN
```

OVER THE WALL



```
VV^^~^    1 LET S=-1
   5 LET S=S+PI/PI
   6 CLS
  10 LET A=INT (RND*10)
  20 LET C=PI/PI+15
  30 FOR G=PI/PI TO PI/PI+9
  40 PRINT AT G+10,15;"(i-)"
  50 NEXT G
  51 PRINT AT 5,0;"(isP:30*96:is
P)"
  52 PRINT AT 20,A;"(isP)"
  53 PRINT AT 20,C;"(9a)";AT 20,
C;" "
  54 IF INKEY$="0" THEN GOTO 80
  60 LET C=C+(INKEY$="8" AND C<3
0)-(INKEY$="5" AND C>16)
  70 GOTO 53
  80 FOR D=C TO C-15 STEP -1
  90 PRINT AT 6,D;"(9a:sP)"
 100 NEXT D
 110 PRINT AT 6,D-2;"      "
 120 PRINT AT 20,D;"(9a)"
 120~PRINT AT 20,D;"(9a)"
 130 IF D=A THEN GOTO 5
 140 PRINT S
```

YOU ARE the inverse square on the right of the wall and your friend is the inverse square on the left. Throw her the paint brush by pressing "ø". The brush will then go up in the air, slide along the roof for 15 squares, and fall again. By moving yourself left and right with keys "5" and "8", see how many times you can throw it without missing her.

Over the Wall was written for the 1K ZX-81 by Neil Benson of Wildwood, Stafford.

QUEST MICROSOFTWARE

FOR ZX SPECTRUM

The battle could be yours.....
.....but it won't be easy!

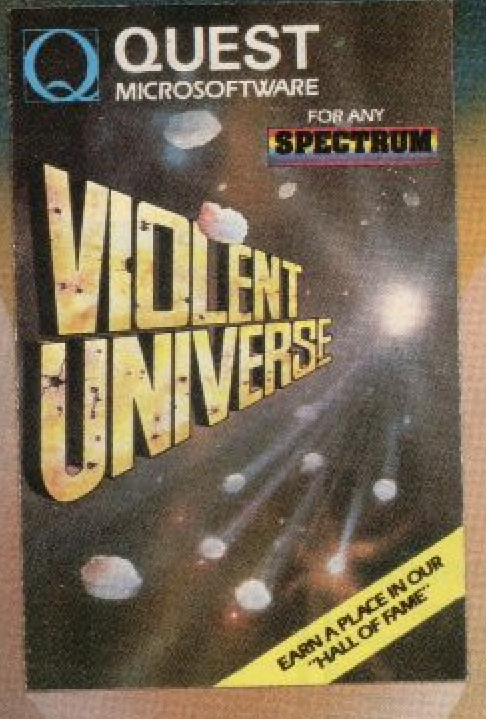
PARTICIPATION – that is the name of OUR game. All our software contains a unique score verification mechanism allowing us to add a new dimension to computer games. Every July and January we will be publishing a ranking list of the top 1000 scorers in each game with the overall top 100 'grand masters' each receiving certificates of merit bearing their position.

September is the last month to qualify for the Black Hole championship. However, from October the sender of the highest valid score each month will win software of their own choice to the value of £50.

The Black Hole is a technicoloured confection of special effects...very demanding; magnificent graphics. (Soft) The explosion effects are some of the best we have seen. ...(Sinc User)

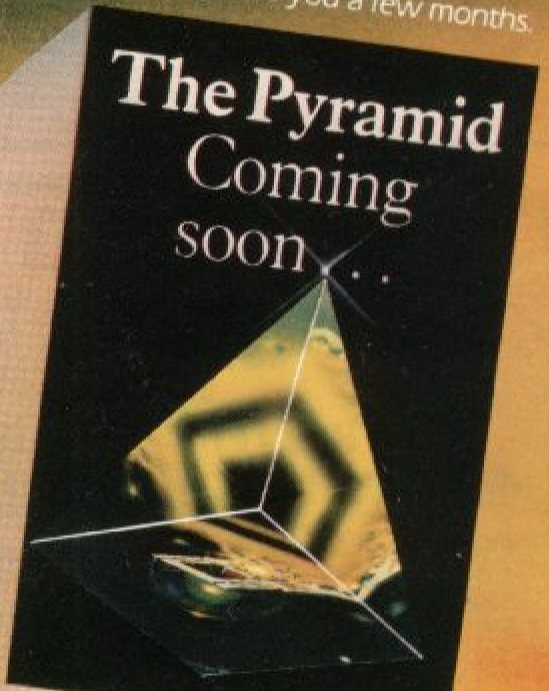


Totally original game plan. Addictive, challenging and offering a complete visual experience with its animated graphics and violent explosive effects. Compatible with ALL leading joysticks.



If you are looking for something that will keep you up all night, cause you to pull your hair out, send you mad with its trickery, then you really shouldn't miss this game.

The mystery of "THE PYRAMID" won't take you a few days to solve, it will probably take you a few months.



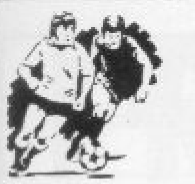
QUEST SPECTRUM SOFTWARE is available from W.H.Smiths, John Menzies and Computers For All

QUEST... ...SIMPLY THE BEST

ASK FOR QUEST SPECTRUM SOFTWARE at your local SOFTWARE RETAILER

THE BLACK HOLE and VIOLENT UNIVERSE for the 16K or 48K Spectrum are obtainable at £5.50 each from QUEST MICROSOFTWARE, 119 THE PROMENADE, CHELTENHAM, GLOS GL50 1NW despatched by return first class post together with a membership number entitling you to discount on our forthcoming blockbusting software.

Trade Enquiries welcome – telephone 0242-583661



STAR SOCCER



The ACTION game with the thrills of real football

Choose your team formations from 3-2-5, 4-2-4, or 4-4-2.
When the game starts it's up to you to plan your moves and outwit your opponents. See the results played out by fast machine code routines on a birds-eye view of the pitch.

Make the split second decisions that the professionals have to!

Shall I make the short safe pass and maybe let the defence regroup?
Or do I try a long defence-splitting ball and risk an interception?
Has my winger got the speed to take on the full back and beat him?
Do I try a long shot and catch the goalie off his line?
Or shall I give the ball to a team-mate in a better position?

The more games of "Star Soccer" that you play, the more skillful you will become. You'll learn how to set up the goal-scoring opportunities, and how to get yourself out of tight corners. You'll develop your own style of play and find out which formation suits you best.

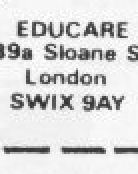
Side 1 features a SUPER LEAGUE competition between 8 top British sides. Aberdeen, Aston Villa, Celtic, Liverpool, Manchester United, Rangers,Spurs and West Ham. 28 games in all and the League Table is automatically maintained for you.

Side 2 replays the WORLD CUP finals. It's a knock-out competition between England, Scotland, N. Ireland, Italy, West Germany, France, Brazil and Argentina. Lots of excitement with sudden-death extra time in drawn games.

It's amazing how so much is packed into 16K!

Available for ZX Spectrum and ZX81
(Please state which machine when ordering) **ONLY £5.95**

Watson Software Services Ltd. (Dept. B1)



1, Ivy Cottages, Long Road West, Dedham, Essex CO7 6EL

Trade enquiries welcome.

EDUCATIONAL SOFTWARE
For children ages 4-11

EDUCARE'S 50

Fifty high-quality programs for primary education
Strongly recommended by educational authorities

on the

ZX81

with

SPECTRUM
SUPPLEMENT

£5·95 Paperback 122 pages

(All programs suit 1K ZX81)

on the

BBC MICRO

(Model A and Model B)

WITH COLOUR, SOUND AND OTHER ENHANCEMENTS

PROGRAMS WRITTEN IN STRUCTURED FORM

£7·95 Paperback 110 pages

NEW

These programs cover a wealth of basic concepts every child will meet in primary education. They are produced by professional educators and have been thoroughly tested in a primary school. Designed to go beyond drill & practice they promote learning through interaction and discovery. Programs range from counting and simple arithmetic to ones dealing with volume, balance and direction, mostly in form of games. Each program is short but powerful and comes with full documentation.

To:
EDUCARE
139a Sloane St.
London
SWIX 9AY

Please send.....copies Educare's 50 on ZX81/Spectrum.
.....copies Educare's 50 on BBC Micro.
I enclose cheque/postal order for £.............
Name.........................
Address.........................
....

Let your child benefit early · Send now SU

TASWORD TWO THE WORD PROCESSOR

48K SPECTRUM

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!

TASWORD TWO The Word Processor

Your Spectrum becomes a **professional** word processor with TASWORD TWO. TASWORD TWO gives you an amazing **64 characters per line** on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port	*Kempston Interface*
Euroelectronics Interface	*Morex Interface*
Hilderbay Interface	*Tasman Interface*

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two also drives the ZX printer.

£13·90 fully inclusive mail order price.

TASWORD TWO TUTOR

TASWORD TWO comes complete with a manual and a cassette. The cassette contains your TASWORD TWO **and** TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

TASWIDE – 64 characters per line!

A machine code utility program, TASWIDE **doubles** the information that your own programs can display. Make a simple change to your print statements and your output appears on the screen at 64 characters per line instead of the normal 32. Both print sizes can be mixed on the screen. 16K and 48K versions supplied on the same cassette.

£5·50 fully inclusive mail order price

TASMAN PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable, connectors, and driving software.

£45 fully inclusive mail order price

All prices include VAT and post and packaging.

TASMAN SOFTWARE

Dept SU

17 HARTLEY CRESCENT LEEDS LS6 2LL

Stephen Sowerby is a member of the Olympic pentathlon squad. Claudia Cooke discovers how he makes time for training

Leading athlete's quest for gold is boosted by ZX-81

INTERNATIONAL athlete Stephen Sowerby swears by his ZX-81. Without it, he says, finding the time to train is much more difficult. At 28, Stephen hopes to make his Olympic debut as one of the four-man modern pentathlon squad in the 1984 Games in Los Angeles.

On top of that, he runs two businesses near his home in Yorkshire and spends what precious spare time he has on his hobbies of photography and wine and beer making. He says:

"I'm impressed with the little beast — the ZX-81. I bought it last December with the idea of upgrading it as soon as I had mastered it but I don't see any need now. It does everything I want it to do".

Before buying his computer, Sowerby had had no contact with anything more complicated than a pocket calculator but he decided that anything which could speed his office workload would be invaluable.

"First, I waded through the book and made it to work. Then I wrote my first program, a simple one for VAT checking which has been fantastic. I found that it was really easy if you used common sense. Of course, there were headaches along the way but I sat down and scratched my head and it all came out right.

"I am pleased to say that I have never bought a commercial program. I have written 10 of my own; the longest is for helping me to do the accounts. The amount of time it saves is incredible. I buy the computer magazines and use some of the programs in them. Apart from being fun they can be really helpful, too, because sometimes you discover you have been using five lines where someone else has discovered a way to say the same thing in only one line".

Running his business, as well as fitting in his sports activities, means that Sowerby is highly-motivated to do everything in as short a time as possible and the computer has helped.

"If I have all my work done by a reasonable time in the afternoon I can leave and fit in more training. So the computer is helping me in my sport, too". Modern pentathlon is a gruelling combination of sports, the aim being to find the best all-rounders. It embraces swimming, running, fencing, shooting and show jumping.



"Swimming was always my main sport at school. I won at county level and was in the national top 10 when I was 17. Then I went to Carnegie College, Leeds to train as a physical education teacher for three years and I stopped competitive swimming.

"My fist job was as a teacher of PE, swimming and outdoor pursuits at Daniel Stewarts and Melville College, Edinburgh, where David Wilkie went to school. I thoroughly enjoyed it but after a year I had the chance to swim competitively again with my old club in Leeds and so I left teaching to give myself more time.

"I was trying to be selected for the Commonwealth Games and that meant four or five hours in the water every day. Then I entered the national biathlon — swimming and running. I had entered it and won while I was still at college and that time I won it again".

Sowerby is modest about that achievement, saying that although he was always the best runner at school, he assumed that was simply because he was fit from all the swimming.

The result of his success in the biathlon was that the well-known pentathlete, Jim Fox, suggested he should try

modern pentathlon. He had never fenced before, never used a gun, and scarcely ridden a horse but after only four weeks' training, he entered his first pentathlon in Cambridge and finished second, despite the presence of seven international modern pentathletes.

Since then he has not looked back. He has risen to international status and travels the world to compete in events as far afield as the United States—three trips already—and several countries in the Eastern bloc.

"I love the travelling and there are so many places I know I would never have seen had it not been for the competitions there. We were in Poland at the start of the crisis and I learned a good deal from that.

"They absolutely revere their sportsmen. There were food shortages and queues everywhere but we had meat at every meal and the autograph hunters were all round us".

Sowerby is the only member of the four-strong Olympic squad who does not train full-time but he sees that as no bad thing.

"I have all the practice I need and in a way I think my job helps, because it takes my mind off things. If you are just training all the time you think only about your sport and it doesn't necessarily do you any good. You just become bored waiting for the next training session.

"I am glad I tried the modern pentathlon because I am so much happier now. You have to be good at all five events but if you don't do so well in one aspect, it's not the end of the world. When I was swimming, one race might make or break me.

"Now I know I am the worst fencer in the squad but I am training hard and my running and swimming are strong enough to compensate for it".

The businesses which Sowerby runs stem from the enterprise of his parents, Dennis and Elsie, who formed their joinery company at Knaresborough 30 years ago. As the business flourished, so more and more customers needed glass, so he formed Knaresborough Glass and now runs both companies with the help of his father.

Set in a small yard off the main street in the sleepy Yorkshire market town, with offices in a building known as the hen hut, it is a far cry from the glamour of the international sports circuit but Sowerby, who last year married a fellow member of his swimming club, is happy to return to his hen hut and sit crouched over his computer.

Since buying the ZX-81 he has also bought an Olivetti printer driven by a Memopak I/F which he keeps hidden under the dK'tronics keyboard.

"The printer has been a marvellous help, too. I have written a word processor program and I use it for all my letters, for final demands, invoices, everything really. I begin to wonder what I did without it".

Sowerby also sees potential for computers in the world of sport. Already they are used widely for results, as well as for much of the administrative work, but he cites a need for them in sports such as fencing. Each fencer's sword has a button on the end which lights at certain points of contact with the opponent and is controlled by a box mechanism. "That box mechanism often fails and as there is only one company making fencing equipment, there is not much we can do but a computer to operate that mechanism could prove far more reliable and I am sure someone could make money producing it".

Sowerby feels the project is a little ambitious for him, although he maintains that if you want to do something, you can usually do it even when, as in his case, it seems as if there will never be the time.

"I do a great deal with my time but I enjoy it all, otherwise I wouldn't do it. I will go on as a pentathlete until I stop enjoying the training. When it becomes a real chore and you don't want to do it, that's the time to stop.

"Many people seem to think I must be sacrificing a great deal for sport but I don't see it as a sacrifice, because I enjoy it.

"The only things I miss are smoking 40 cigarettes a day and probably being overweight by the age of 18. So where's the sacrifice?"

Financially, Sowerby has to be self-supporting in his sport and that can mean sacrificing some expense — the Spectrum, for example, for which he sees no need in his office but on which he loves playing games for its colour and its extra graphics.

Any purchase not essential to him stays in the shop but that could be why both his business and his sporting career are proving so successful.

'I have written a word processor program and I use it for all my letters. For final demands, invoices, everything really. I begin to wonder what I did without it'



PROGRAMS WANTED

SPECTRUM DRAGON
BBC ZX81

WORK FORCE

THE BIGGEST
LITTLE SOFTWARE
HOUSE AROUND



DO NOT PASS GO

Now the SPECTRUM VERSION IS READY
D.N.P.G. is a complete simulation of THAT BOARD GAME you know PARK LANE and all that. Up to SIX PLAYERS can compete with the MICRO doing all the work. Acts as DICE THROWER, BOARD, RENT COLLECTOR, UMPIRE, BANK, RULE BOOK, ACCOUNTANT, ESTATE AGENT and ASSET RECORDER. SUPERB GRAPHICS by GARRY KENNEDY (thanks mate). GAME SAVE with winner so far report. Complete with full instructions. The ULTIMATE in FAMILY GAMES. DON'T MONOPOLISE YOUR MICRO. AMAZE your friends and family. (Can you imagine your GRANNY on a MICRO?) A 16k ZX81 version also available. 48k SPECTRUM or 16k ZX81 versions **ONLY £6.95.**





THE WINGED AVENGER

Fast and furious. Two versions of the same game on the SPECTRUM tape,, the original and the NEW VERSION. SOUND, GRAPHICS, SEVEN SKILL LEVELS. Full ARCADE ACTION including THREE WAVES OF ALIENS, HIGH SCORE, REFUELLING, RAPID REPEAT FIRING, SMART BOMBS and LASER SHIELD. P.C.W. ''ONE OF THE BEST SINCLAIR GAMES YET''. HOME COMP WEEKLY ''FOUR STAR WINNER''. 16k ZX81 VERSION ''PROBABLY THE FASTEST ZX81 GAME''. NOTED as EXCELLENT by the INTERNATIONAL BUREAU OF SOFTWARE TEST. 16k ZX81 & 16+48k SPECTRUM VERSIONS AVAILABLE. **NOW £5.00.**



BASE INVADERS

S.USER ''DIFFICULT TO BEAT . . ONE OF THE MOST ADDICTIVE'' . . 16 & 48k SPECTRUM. CURRENTLY THE FASTEST VERSION FOR THE SPECTRUM. SHIELD AVAILABLE if you can't HANDLE THE ACTION.

YAHTZI

48k SPECTRUM. All ELECTRIC VERSION of the classic dice game of STRATEGY. More CHUNKY graphics from GARRY KENNEDY. No extras required up to SIX PLAYERS can compete, or practise if you wish. SPECTRUM acts as UMPIRE, SCORE SHEET and DICE THROWER. Update your games cupboard for just **£5.50.** 48k only.

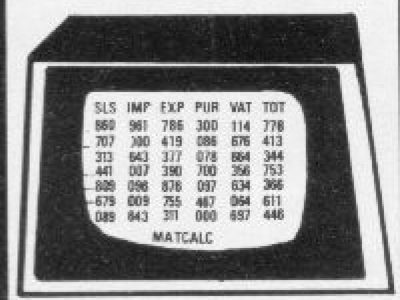
SCRAMBLE

Spectrum SCRAMBLE (Condition Red)
EIGHT DIRECTIONAL KEYS. All MACHINE CODE. LASERS, BOMBS, ROCKETS, INSTANT RESPONSE, CONTINUOUS SCORING, SOUND, FUEL DUMPS, RED METEORS, DEFENDER CRAFT and HIGH SCORE. BEWARE CONDITION RED you must REFUEL. ''THE REVIEWERS DIDN'T GET TO THE FINAL STAGE''. 16 & 48K SPECTRUM. **JUST £4.95.**

PROGRAMMERS DREAM

16k or 48k SPECTRUM.

An advanced SPECTRUM TOOLKIT. Comprised of just 1450 BYTES of POSITION INDEPENDENT MACHINE CODE. RENUMBER lines or blocks. Allows START, FINISH, INCREMENT and new START to be defined. BLOCK or line MOVE including RENUMBER to fit available GAP. RENUMBER will renumber ALL GOTO, GOSUB, LIST etc without further action. CHANGE strings (NAMES or CONTENTS. DUMP VARIABLE NAMES and CONTENTS to DISPLAY PROGRAM SIZE with or without VARIABLE SIZE. This package is FAST, CLEAN, PRODUCES ERROR MESSAGES and is WELL DOCUMENTED. S.USER ''WORKS LIKE A DREAM'' SPECTRUM ONLY **£6.95.**



''SHIFTY'' 48k SPECTRUM

A WORD PROCESSOR FOR THE SPECTRUM. ''SHIFTY'' was designed to overcome the limitations of the standard SINCLAIR HARDWARE, specifically the PRINTER. Using the STANDARD PRINTER all output over 32 CHARACTERS PER LINE is PRINTED SIDEWAYS allowing pages to be formatted from the printer paper. Any width from 20 to 80 characters per line may be specified. Text can be viewed prior to printing and can be JUSTIFIED to the RIGHT MARGIN. SHIFTY will WORD SEARCH, MOVE PARAGRAPHS, SPLIT PARAGRAPHS, APPEND PARAS, SAVE and LOAD from TAPE, INDENT PARAS and allow standard PHRASES to be STORED and accessed from DATA STATEMENTS using DEFINED KEYS. EDITING is ON SCREEN using 4 way CURSOR MOVE. SHIFTY comes complete with a sample letter and full instructions. Requires ZX printer. **ONLY £7.50.**

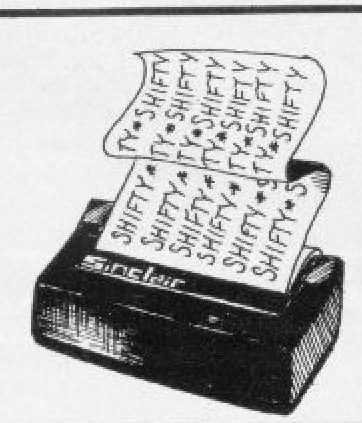


NEW RELEASE
''JAWS REVENGE''
48k SPECTRUM

Disappointed with his box office returns JAWS brings his GORY EATING HABITS to the SPECTRUM in his very own ARCADE GAME. JAWS eats his way through a mixed diet of DIVERS, BOATMAN, JELLYFISH, SWIMMERS and FISH. You control JAWS in this FAST MOVING trail of carnage. Avoid DEPTH CHARGES, EXPLODING JELLYFISH, HARPOONS, ARMED SCUBA DIVERS and EAT everything you can. 5 LIVES, SCRAMBLE type SEA BED, current and HIGH SCORE. ALL MACHINE CODE and FAST, DEMO SCREEN. BONUS LIVES, FASTER GAME FOR 10,000 POINTS. WREAK HAVOCK ON THE HUMAN RACE. ''THE BEST GAME YET'' ANIMAL RIGHTS MOVEMENT''. 16 & 48k SPECTRUM **£5.00.**

MATCALC
16 & 48k SPECTRUM

This is our SPREADSHEET PROGRAM with a difference. This ONE has the option of the standard display or a 64 CHARACTER per LINE display or printout. Ideal for WHAT IF, CASH FLOW PROJECTIONS, and analysing related figures. FORMULA may be MATHEMATICAL or LOGICAL. MENU DRIVEN. SAVE and LOAD to TAPE. FULL instructions and TWO matrices on TAPE with a full explanation of their formation. P.C.W. ''MORE FLEXIBLE overall than . . . ''. Both the 16k & 48k versions on ONE TAPE. SIMPLY HUNDREDS OF USES.
JUST £7.00.







DISPLAY

How would you like 273 different USER DEFINED GRAPHICS on a 16k SPECTRUM or a FULL 336 on a 48k. All can be displayed on screen at the SAME TIME. U.D.G's are stored as PAGES and any two pages may be EXCHANGED in MEMORY. FILES may be SAVED or LOADED from TAPE at a USER specified location. TURN a UDG one quarter or half turn. FLIP a UDG over, REVERSE a UDG, EXPAND a quarter UDG into a FULL CHARACTER. MOVE a UDG one PIXEL at a TIME, UP, DOWN, LEFT or RIGHT. FIVE complete TAPE FILES are INCLUDED on tape ONE CONTAINING a 64 CHARACTER DISPLAY. DESIGN GRID for constructing CHARACTERS and SHAPES. FULL INSTRUCTIONS and ANIMATED DEMO SCREEN. **£7.00.** 16 & 48k SPECTRUM.

STOP PRESS
ARCADE-ACTION 16K ZX-81
FAST MACHINE CODE GAMES

3-D SPACE BATTLE. Best 3-D effects on a ZX-81. 8-directional movement. 6 images per second. £4.50.
PHANTOMS. Munch your way around a maze. Power pills, 3 mazes, 2 levels. Very fast. £3.95.
SURROUNDED. High speed arcade action. Knock his block off! £3.95.
DANGER TRACK. 5 attacking cars. Recover 10 flags. Maze 30× larger than screen. On-screen radar. Oil slicks and smog bombs. £4.50.
''You will not be disappointed with the action.''
All 4 games for £14.00.

THE PROGRAMS ON THIS PAGE ARE ONLY AVAILABLE FOR SINCLAIR COMPUTERS
16K ZX81

CONDITION RED **£3.95**
TOOLKIT **£5.00**
ADVENTURE IN TIME . . Nearly 60k of ADVENTURE in parts for the 16k ZX81 . . . **£7.00.**
WINGED AVENGER **£4.50**
DO NOT PASS GO **£6.95**
Most programs available from BUFFER, MICROWARE, SOFTWARE SUPERMARKET, GREENWELDS, HEFFERS, JOHN MENZIES and selected SPECTRUM COMPUTER FRANCHISES. DEALER ENQUIRIES WELCOME.

WORK FORCE

140, WILSDEN AVENUE
LUTON BEDS.

Post Included

Brute force is the only way to keep in check

Programmers have long looked at ways of playing chess on computers. Chris Whittington points out some of the problems

BROADLY, there are two main schools of thought concerning the problem of programming computers to play a game such as chess. The first and most dominant suggests that the way forward is to use the number-crunching power and speed of modern computers to plough their way through as many possible paths arising from a particular position, apply some simple evaluation to the positions arising in the path, and by that method arrive at the best move. That approach has become known as the brute force method.

The second school of thought points to the highly-successful techniques already applied by human players to the problem and suggests that the best approach would be to teach the computer to think like the best human players. We shall call this the knowledge method.

Faced with the problem of producing an effective chess-playing program for a home computer such as the Spectrum, we can probably discard the knowledge method, if only because we still have no real idea how it is that human grand masters decide on their next best move. Indeed, what do we mean by best move? There is no real choice at present other than to use the brute-force method for solving the problem.

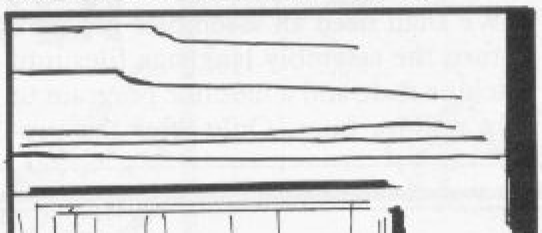
Before we begin to explore a possible solution it would be best to examine in some detail the nature of the problem. Chess is a two-player game. Whatever is good for one side is bad for the other and vice-versa; such games are known as 'zero-sum games'. That will allow us to make statements such as this move gives White a score of +250 and thus gives Black a score of −250.

The game is played on a board of fixed size with a fixed number of pieces; therefore we should be able to represent the board and pieces in some way in the computer memory.

The laws of chess define how the pieces move, whether any position is illegal — for example, leaving one's king in check — and how to decide on wins, losses and draws. In principle, therefore, we should be able to define and encode all the possible ways of moving a chess piece, detecting checks and so on.

Unfortunately, from our point of view, a number of different chess pieces each move in a different manner and some of them move in some different manner in special circumstances — for example castling, *en passent.*

I suspect that the apparently daunting task of defining all those possible moves for each of the pieces and encoding them into assembly language deters



many a budding chess programmer from beginning the task. Some of the early chess programs, and even some one can still buy, avoided the problem by not implementing the difficult portions, with the result that their program just never did castle or capture *en passent.*

The problem is not as daunting as it seems; one can work out routines to do the task and there are published algorithms, and even listings, which can remove some of the tedium.

Since we have to decide on a best move we will need some way to evaluate, or attach a number to, any move. The conventional wisdom is to keep that position evaluator as simple as possible, usually measuring the balance of material and a few positional factors. It will be of interest to note that the positional evaluation will be the only part of the program where chess knowledge and skill, as apart from a knowledge of the rules of the game, will be required.

There has been much controversy between strong chess players and computer programmers as to whether poor chess players can produce good chess programs. Certainly the best programs usually have been prepared with the help of strong players and my feeling is that substantial chess knowledge is of most use after the program has been completed and is being play-tested to tweak the program to its optimal performance by adjusting the evaluation function.

Then we have the problem of how to plough our way through all the moves to arrive at our brute-force solution. In chess programmers' parlance that is known as the 'exponential explosion problem' and it goes something like this:

On the Spectrum we can evaluate a position in, say, 25 milliseconds. In any one chess position there will be around 30 legal moves to consider. Thus to look one half-move deep we need to evaluate some 30 positions to arrive at the best move. That takes 30 times 25 milliseconds, or 0.75 seconds.

To search two-ply deep we need to look at 30 positions and all the 30 positions arising from each of those — 30 times 30 positions in all will take 900 times 25 milliseconds or 18 seconds.

By that reckoning to search three-ply

continued on page 92

continued from page 91

takes nine minutes, four-ply takes 4.5 hours, five-ply takes almost a week, and so on.

To achieve good results against strong players, a program will need to search between eight- to 10-ply moves deep. According to the previous calculations an eight-ply search would take 400 years to complete. Such a game, starting in pre-history might now be nearing completion.

If we are to get anywhere using brute-force methods we must concentrate on refining our search through the tree of moves to reduce or eliminate the blow-up effect. As an aside, a game such as draughts, which has far fewer possible moves arising from any one position, does not generate such severe problems and thus machine-coded draughts programs are more likely to defeat strong players than similarly-encoded chess programs.

Fortunately there are several methods to refine the tree search. The programs available on the Spectrum and ZX-81 have reduced the multiplication factor for each ply from about 30 times to around four to eight times.

Adopting a top-down approach to the problem, we can formulate our first statement of the approach we shall be taking.

We shall use the method of brute force with refinements, evaluating each node — position — in the tree of moves according to a simple and fast evaluation function, biased heavily by material factors.

The program will need to be as fast as possible and must therefore be encoded into machine code. Basic would be far too slow.

> 'We must concentrate on refining our search through the tree of moves'

We shall require adequate tools for this task. As a minimum we shall need a powerful editor to work on the assembly language files. Since those files may be as large as 40K bytes — 100K bytes when properly documented — we shall need a disc-based system to hold them.

We shall need an assembler program to turn the assembly language files into machine code and a monitor program to help remove bugs. Only after the program is running without bugs shall we consider putting it on to our small home computer system.

Our next task will be to break down the problem further and define particular areas of the program to which we must attend.

Main modules — tree-search algorithm; move generator; is king in check? detector; position evaluator.

Database — how to represent the chessboard; how to store the moves and positions as we move up and down the tree; tables containing knowledge about the position which can be used by the position evaluator.

REFERENCES

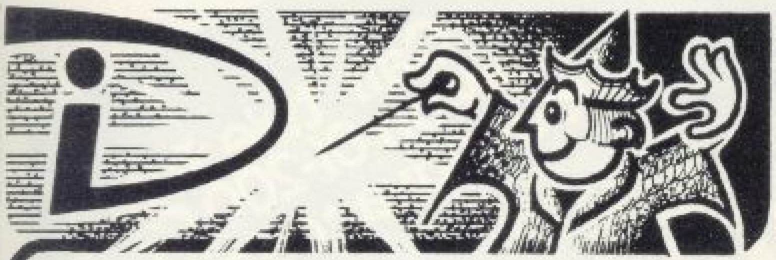
Chess skill in man and machine. Editor, Peter Frey. Publisher, Springer-Verglag.

Sargon, a computer chess program. Authors, Dan and Kathe Spracklen. Publisher, Hayden.

The machine plays chess? Author, Alex Bell. Publisher, Pergammon.

Think like a grand master. Author, Alexander Kotov. Publisher, Batsford.

Chris Whittington, the author of this article as well as eight available chess programs, is now working on yet another chess program and would be pleased to receive wisdom and new ideas from readers. He can be contacted either through *Sinclair User* or CP Software.



THIS SPACE INTENTIONALLY LEFT BLANK

Your masterpiece could appear here. We need good, original machine-code programs for the Spectrum and Oric. Excellent royalties or cash payments offered for high quality games. If you have written an exceptional program, please send a copy to the address below for immediate evaluation.



NIGHT GUNNER

Enemy aircraft approaching . . . BATTLESTATIONS!! Waves of enemy fighters swooping in for the attack? Can you survive another mission? This is the ULTIMATE challenge. An entertaining machine code game with excellent graphics. Requires ZX81 with 16K RAM pack.

Highly addictive! £4.95 inc.

Now Available at major branches of WHSMITH



FIGHTER PILOT

15 feet . . . 7 feet . . . TOUCHDOWN! Instrument landings are not always as easy as this. You are in full control from take-off to landing during this real-time flight simulation of a jet fighter. Written by pilots — tested by pilots — for you to fly like a pilot.

'An excellent program!' Capt. H. Senior British Airways pilot.
Requires ZX81 with 16K RAM Super value at £4.45

DIGITAL Integration

DIGITAL INTEGRATION
Dept. SU
22 Ash Church Road,
Ash, Aldershot
Hants GU12 6LX.

MAIL ORDER ONLY

TRADE ENQUIRIES WELCOME

All prices inclusive
(Overseas add £0.55 p&p per tape)
All products guaranteed, refund if not satisfied.

SPECTRUM 48K : ZX81 16K SIX PART ADVENTURE



BLACK CRYSTAL

THE QUEST IS ABOUT TO BEGIN

The ultimate role-playing adventure for the SPECTRUM/ZX-81. You can become a warrior, elf or wizard on a quest to find and use the rings of creation; to destroy the Black Crystal and defeat the Lords of Chaos. Held within six programs lies a land of fabulous treasures and mythical monsters. Journey through the land of Beroth, explore the castle of shadows, descend into the Shaggoths lair, search for diamonds in the sea of sand but beware of sand sharks! Confront the fire demon in his temple, battle against the Lords of Chaos and win your way to the Black Crystal.

By splitting Black Crystal into six programs we can provide more variety and detail than any other adventure for the Sinclair computers.

Real time monster battles. Superb graphics. Save game feature. All six parts are supplied together on cassette, boxed with instruction booklet.

SPECTRUM 48K: 180K OF PROGRAM IN SIX PARTS — ONLY £7.50
ZX81 16K: OVER 100K OF PROGRAM IN SEVEN PARTS — ONLY £7.50
WHY PAY MORE FOR LESS OF AN ADVENTURE

CARNELL SOFTWARE

To: CARNELL SOFTWARE LTD, DEPT 2, NORTH WEYLANDS INDUSTRIAL ESTATE, MOLESEY ROAD, HERSHAM, SURREY KT12 3PL.
Please send me: Black Crystal for my:

Spectrum 48K £7.50
ZX8 16K £7.50

I enclose a cheque/postal order (payable to Carnell Software) for £

NAME ....

ADDRESS ....

TRADE ENQUIRIES WELCOME

In the first of a new series, John Gilbert introduces an alternative to Basic. Later we will be showing how to make use of its advantages

Coming Forth could be a winner in program stakes

FORTH is a new language in microcomputer circles but it has been around for several decades. It was designed originally to control a radio telescope. Since then it has been used in control applications and is seen as an ideal language for the programming of robots and industrial machinery.

This series will explain how Forth is structured, how you can program using it, and how you can change the language to suit your needs.

Forth is now seen as an important language because it is faster in execution than Basic and it is one which can be learned very quickly by a newcomer to computing.

Some people may find it more difficult to use than Basic because it does not use line numbers and the programs written using it are in the form of several routines and not one mass structure. In that way you can have several programs in the computer at once.

If you are to follow my arguments you will need to forget about the way in which you program in Basic. Forth is completely different and, as you will soon see, you cannot be as liberal in its use as you were with Basic.

One of the reasons for using Forth in the control of machinery is its speed compared to other high-level languages. For instance, Forth is more than 10 times faster than Basic and a game of Space Invaders written using it would move almost as fast as if written in machine code. The reason is that Forth is closer to machine code than to other high-level languages.

When Forth was introduced there was no standard for the language, so an organisation called the Forth Interest Group was formed. Since then a new, second standard has been introduced which is called Forth-79. That does not differ much from Fig-Forth but Forth packages are now divided into the two standards.

Most of the packages available for the Spectrum and ZX-81 use Fig-Forth, although some provide only a subset of the language. For instance, Forth programs are divided into screenfuls of memory. The Artic Forth package allows only one screen in memory at a time, whereas other packages, such as that from Abersoft, allow several screens.

There are several packages from which to choose, so each will be covered in turn and finally a standard will be determined for the series.

Sinclair Research has just adopted Artic Forth for the ZX-81 and 48K Spectrum, which use the Fig-Forth standard. The package includes the cassette containing the Forth language and two booklets. The thicker booklet explains the language and the slim one shows how the program editor should be used. The function of the editor will be described in more detail next month.

The packaging of the Artic cassette is colourful but the version of the language has some limitations. Forth programs are stored by the screenful in memory. Each screen is addressed by a number, so if you wanted to recall a program which was stored on screen 1 you would use that index number to access it as the current screen.

In that way you can store several programs, called words, in the machine at any time. The current screen is the one on which you are writing at the moment or the one which is being used by the computer.

continued on page 96



continued from page 95

The number of screens which can be stored in the computer at once is, of course, governed by the memory available. It is possible to store several screens of program in both the ZX-81 and Spectrum but Artic Forth will store only one. If you want to use screens other than the current one you have to load them from cassette, one at a time. That is irritating because such a process is not necessary with the memory capacity available.

The other difficulty with the package is that the documentation — the two manuals — does not provide a sufficient introduction for the beginner. The difference in approach between Sinclair Basic and Forth is not made apparent enough and the transition between the two languages is not easy using the manuals.

After all, the user will have a knowledge of Basic and an introduction to a second language will be much more difficult than an introduction to computers through Basic. It often means becoming used to new concepts and not just new language statements.

The second package is slightly better and contains a full version of Forth. It is from CP Software, called Spectrum Forth. Owners of 16K Spectrums will be pleased, as CP does a version of the language for that machine. Spectrum Forth also includes a program written in Forth so that the user can run an example before delving into the depths of the language.

The final version is from Abersoft. It is also for the Spectrum but will run only in 48K. It has a bigger dictionary capacity for programs than the 16K version from CP.

It is a complete version of the language with added colour, attribute and graphics instructions which can be used to zap space invaders around the screen, if you are that way inclined. It is also possible to define your own characters just as you can in Spectrum Basic.

Unfortunately the product has a manual which is concise but not easy to understand. It is a flimsy booklet which has not been written to inspire confidence for the first-time user.

Of the three packages available, the one to be used in this series will be that from Abersoft. It is the only Spectrum package which has been endorsed by the Forth Interest Group. It is a complete Fig-Forth package which allows several screens of program in memory at the same time.

> 'Forth is closer to machine code and more than 10 times faster than Basic. A game of Space Invaders written using it would move almost as if it is written in machine code'

The Abersoft manual is not good but there are several books on the market which explain Forth and its application in terms the beginner will understand.

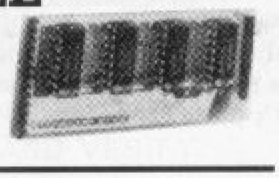
One good book is *The Complete Forth,* by Alan Winfield. It is published by Sigma Technical Press and gives an introduction to Forth concepts. The book uses Forth-79 but there is much information which will be useful to the Fig-Forth user. Next month I will explain the structures which are used in Forth. You will see that the language does not use line numbers but this makes it easier and not more difficult to use.

SPECTRUM AND ZX81 HARDWARE



The famous Panda Expandable Ram Pack. Massive 16K add-on memory which can easily be expanded to 32K with an optional plug-in module. Supplied in rugged no-wobble design, rugged, injection moulded case, contoured to fit the ZX81 snuggly. Compatible with other add-ons (printer etc). LED on/off indicator. No additional power needed just plug in an go. British designed and made from top quality components throughout, guaranteed 12 months. **£19 · 95**

EXPANSION MODULE

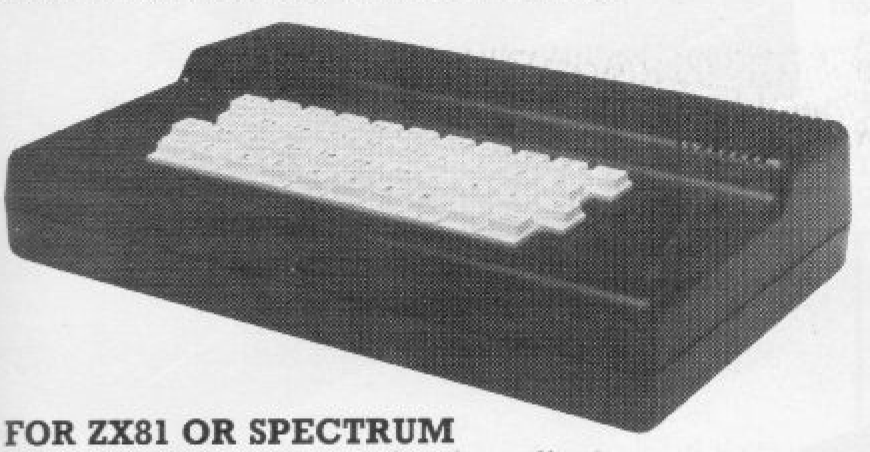


The 16K 'Panda' is easily expanded from 16K to 32K by adding this expansion module as and when you need it. **£14 · 50**

GIANT PANDA

Giant Panda the two together. Buy the Panda and the Expansion Module at the same time for a gigantic 32K bytes and save.
Complete at a special price of **£34 · 00**

PROFESSIONAL CASED KEYBOARD TYPE FD42



FOR ZX81 OR SPECTRUM

This famous, best selling product immediately converts your ZX Computer into a sturdy, attractive and professional unit, with full size typewriter keyboard. A tough plastic case encloses the keyboard, PCB and power supply. It has 42 keys including all the ZX81/Spectrum graphic characters printed on them. The full travel key switches have gold plated contacts and guaranteed life of 10^6 operations. It's so easy to install! You simply unscrew the ZX PCB from its case, screw it to the FD case, and plug in the keyboard. No soldering. Access to user port is unobstructed for memory upgrade etc. Full instructions supplied. **£29 · 95**

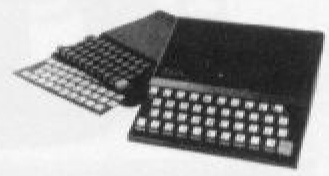
Fitting service **£4 · 00**

RAM Adaptor Board—enables you to fit 16K Expansion (all types) inside Fuller-case— **£9 · 75**

TYPE FDS FOR ZX81 OR SPECTRUM

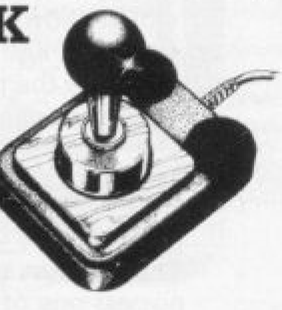
Our new advanced keyboard has the same, fine specifications as the FD42 system, but with a new re-designed case, space bar and double-sized shift and enter keys. A must for the discerning ZX81 or Spectrum user. **£39 · 95**

ZX KLIK— KEYBOARD



If, like many ZX81 users, you are fed up with the dead feel of the touch sensitive keypad then consider the well tried 'Klik-Keyboard'. This is a simply fitted genuine push button keyboard which has been designed as an exact replacement for, and is no larger than, the existing keypad. ■ Fits on to the ZX81. ■ Full 40 keys plus one spare for any purpose. ■ No soldering—just plug in. ■ No trailing wires. ■ Clear permanent two colour legends. ■ Positive feel and sound as data is entered. ■ Speeds up programming enormously and reduces errors.
■ Fitting service offered £2.00 extra (remember to send your ZX81). **£24 · 50**

SPECTRUM JOYSTICK



NOW AVAILABLE FROM **AFDEC**
Outstanding Features
- Self centring stick.
- Super strong nylon and steel construction, built to last.
- A total of 8 directions plus 2 large fire buttons.
- Arcade proven moulded leaf switches ensure incredible reliability.

For **ZX Spectrum** Complete with self contained box interface which simply plugs into the Spectrum expansion port (with or without printer) **£25 · 00**

THE SOUND EXPANDER

A superb economical addition to your ZX Spectrum. Clear, dynamic sound effects will really enhance your enjoyment of the new exciting programs available for the Spectrum. Our new sound amplifier comes with lead, pre-setable volume and built-in loudspeaker. Simply plug into the mic input, it fits neatly behind the Spectrum. **£7 · 50**

STOP PRESS!

REDUCED due to volume sales
16K Spectrum owners—upgrade to 48K with a Spectrum Upgrade Pack complete with full instructions.
No Soldering.
Issue II and III. **£26 · 00**

The lowest cost 16K RAM pack known to us!



■ Boxed ■ Tested ■ Guaranteed
■ Thousands in use. **£18 · 50**

Please supply (state which computer you have).

Quantity	Item	Amount

Round-the-clock telephone orders 0256 52208
I wish to pay by
Access/Barclaycard/Visa/Diners Club
Please debit my creditcard a/c
NUMBER □□□□□□□□□□□□□□□□
Signed ....

All prices include VAT and post and packaging. All items include a full year guarantee. Products are stocked and usually despatched within 10 days. Overseas customers add £4 post and packing. Cheques/Postal Orders etc. should be made payable to AFDEC Electronics Ltd.

Name
Address

EXPORT ORDERS WELCOME PLEASE ADD £4.00 P&P.
Round-the-clock telephone orders 0256 52208

AFDEC ELECTRONICS LTD 318 Kempshott Lane Basingstoke Hants RG22 5LT

ZX 80/81 SPECTRUM HARDWARE

SPECTRUM/81 TOOLKIT BOTH AT ONLY £6.95

This is the toolkit which won acclaim in the feature in the August 1982 issue of Sinclair User. "It is the most impressive programm, fast in execution with clear and full instructions . . . . it stands out from the rest of the field". The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER, AND VERIFY. The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the 16K and 48K Spectrum.



4K GRAPHICS ROM £24.95

This module unlike most other accessories fits neatly inside your computer under the keyboard. The module come ready built fully tested and complete with a 4K graphic ROM.This will give you an unbelieveable number of extra pre-programmed graphics. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders, graphics and that only accounts for about 50 of them, there are still approximately 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

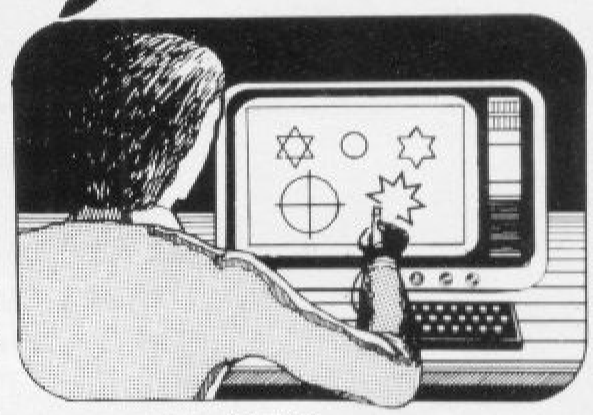
SPECTRA-SOUND

The so called speaker in your Spectrum is really only a 'buzzer'. With the DK Tronics "SPECTRA SOUND" you can generate fully amplified sound through the speaker on your T.V. set. SPECTRA-SOUND is a very simple but highly effective add-on. This means that you no longer have a faint beep but a highly amplified sound, which can be adjusted with the TV volume control.

The SPECTRA SOUND fits compactly and neatly inside the Spectrum case and is connected by three small crocodile clips. **NEW AT ONLY £9.75**

£19.95 Light Pen

LIGHT PEN



The pen enables you to produce high resolution drawings on your own T.V. screen. The controlling software supplied with the light pen has 16 pre-defined instructions. These are chosen from a menu positioned at the bottom of the screen next to the pen.

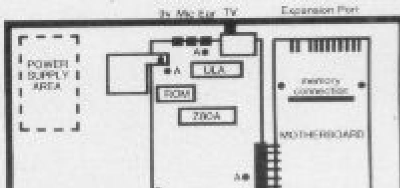
You can utilise the menu for changing colour (Border, Paper, Ink). Drawing circles, arcs, boxes, lines. You are also able to fill any object with any colour, and insert text onto the screen at any chosen place. Of course you can also draw freehand. There is a feature to retain the screens and animate. On the 48K Spectrum you can retain 5 screens.

You can also use the machine code on it's own in your own programs, for selecting out of a menu etc. The software provided will return with the X,Y, cords for it's position on the screen.

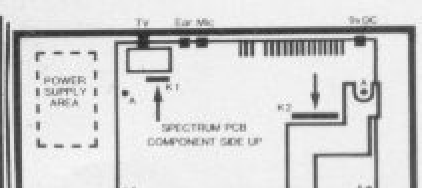
The light pen is supplied with a control interface in order to adjust the sensitivity/pen alignment.

This simply plugs into the ear socket on your spectrum.

Should you require further details please send a S.A.E.



Internal fixing for ZX 81 keyboard case.



Internal fixing for spectrum keyboard case.

Please state type of machine, which ROM memory size, quantity, and place when ordering.

Please send me . . . .@ £ . . . .

Please send me . . . .@ £ . . . .

Please send me . . . .@ £ . . . .

Please add on £1.25 for p/p

I enclose cheque/P.O. payable to DK Tronics total £. . . . .

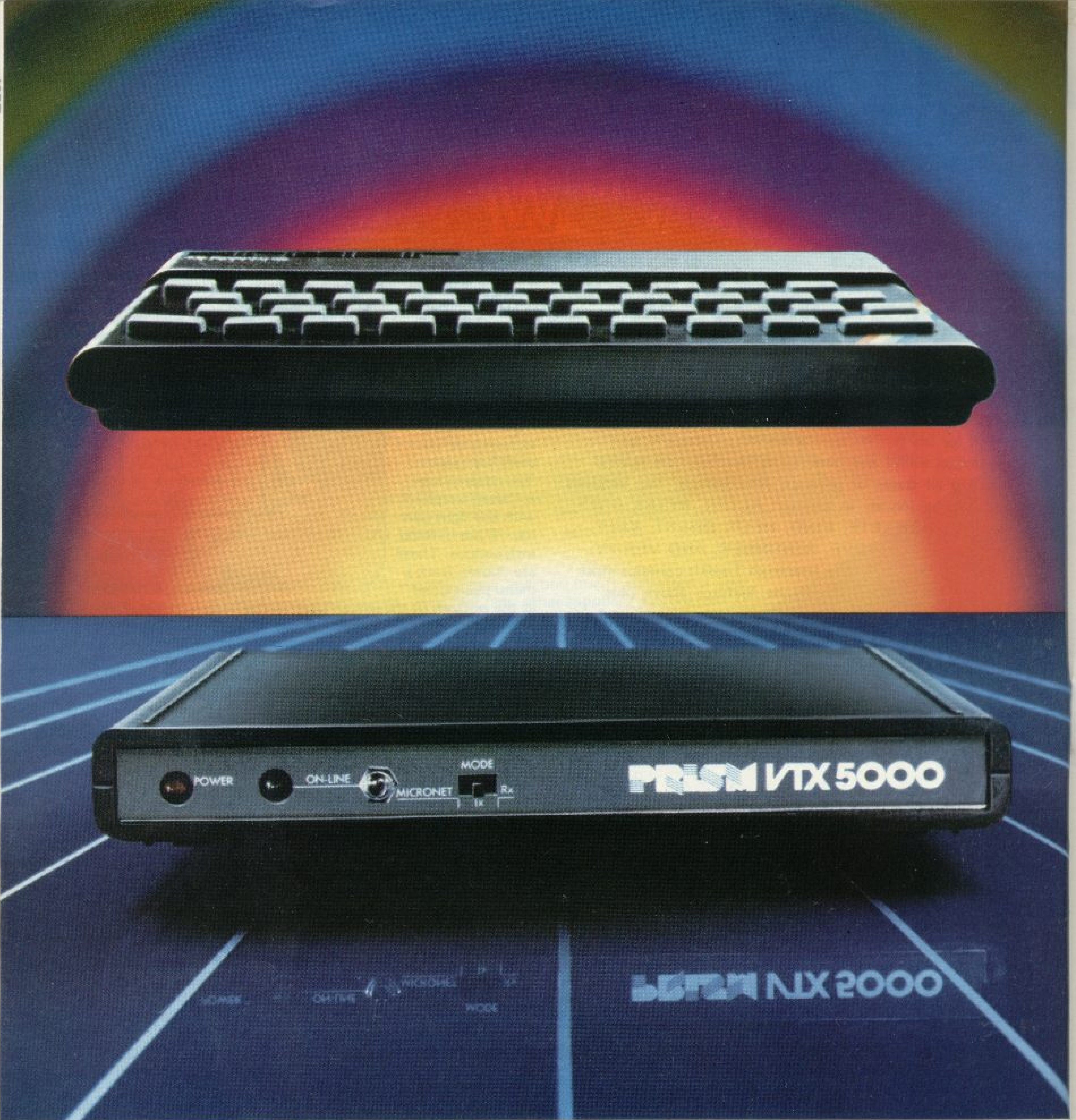
or debit by Access/Barclaycard No.

Signature. . . . .

Name . . . .

Address. . . . .

Send to DK Tronics, Unit 2, Shire Hill Ind Est, Saffron Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines.



offers the most sp
under the Spec

See us on Stand No. 439,
Personal Computer World Show,
28 September – 2 October
Barbican Centre,
City of London

™Prestel and the Prestel symbol are trademarks of British Telecommunications.
**Subscribers are responsible for quarterly Micronet 800 and Prestel subscription charges.*

Micronet 800. The spectacular service that gives micro-users access to a huge database of information, hundreds of software programs, and communication with other users.

Sinclair ZX Spectrum. The home computer that's out-shone all its rivals.

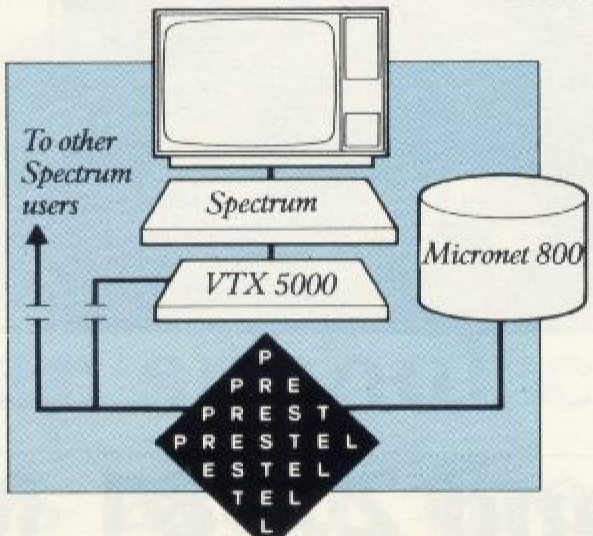
Bring the two together and it's a combination that opens up a breathtaking new world of microcomputing possibilities.

Suitable for either the 16K or 48K versions, the Prism VTX 5000 modem was designed specifically for the Spectrum and fits neatly under the micro.

Plug the other end into the outside world via your telephone and your system will give you more than you ever dreamed possible.

Micronet 800 is fun, friendly and inexpensive to run. Choose from hundreds of free games, download and use them on your Spectrum whenever you like, play on-screen games (as easy – and inexpensive – as a local phone call), and compete in Big Prize games and quizzes. There's also a range of downloadable games you can buy for less than over-the-counter prices.

Learn through up-to-date education packages, and help run the household with simple business packages.



And if you need fast facts about the world of computers, Micronet 800 provides constantly up-dated product comparisons, reviews, prices, dealership and 'best-buy' information – 24-hours a day, 7-days a week.

You can access the whole range of Prestel™ information covering news, travel, holidays and entertainment, together with an electronic booking service.

Keep in touch – you can send electronic mail to any other Micronet 800 or Prestel user.

The VTX 5000 provides a full Prestel screen with graphics, and an off-line message composition facility for speedy transmission when you go on-line.

You can use the Sinclair printer to print frames and messages, or save them on tape for future use.

All this – and even more as the service grows – would normally retail at the low price of £99.95 inc VAT.

But if you join Micronet 800 before September 30, we will make you a very special offer.

Micronet 800 will provide the VTX 5000 inclusive of VAT, post & packing and (if you need it) a free jack plug installation for the incredibly low price of £74.95 – a saving of £25 on the normal retail price.*

So don't delay – send the coupon today.

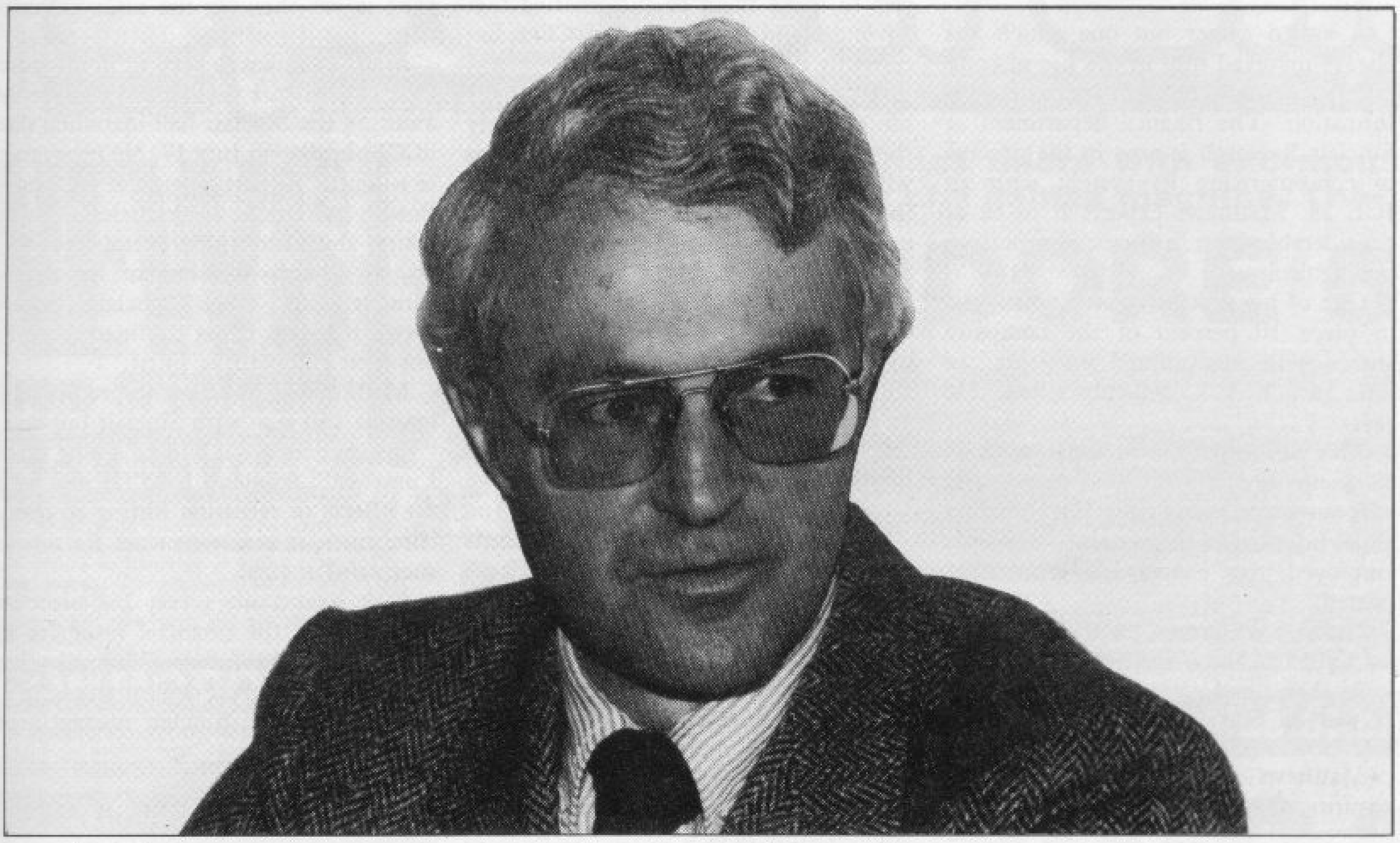
Micronet 800
pectacular add-on
ctrum.

micronet 800
One of the many faces on Prestel.

☐ Please send me a complete Micronet 800 information pack containing details of Micronet 800 and the VTX 5000, and including a Micronet subscriber's application form.
☐ Please send me ____ (No.) VTX 5000 modem(s) at £74.95 each inc. VAT:
☐ I enclose a cheque made payable to Telemap Ltd. for £____
☐ I wish to pay by credit card: Visa, Access, Diners Club, American Express.
(Delete as applicable) Amount £____
My credit card No. is ____ Signed ____
Name ____ Address ____
____ Tel: ____ SU4

(Please allow 28 days for delivery.)

Micronet 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Tel: 01-278 3143.



Former school chum now looks after the money

In the management changes at Sinclair Research last year, Bill Matthews became financial director. He talks to Claudia Cooke

BILL MATTHEWS sits in his office and smiles at the recollection of his old school chum, Sir Clive Sinclair, tinkering with radios while the other boys listened to them.

"He was innovative even at that age, you know. He was always tinkering with something and he made his first matchbox-sized radio while we were still at school.

"We lived very near each other in Guildford and I remember going to his house for enthusiastic demonstrations of his latest plans. I think he was very much an individual character and did not fit into the standard schoolboy image at all".

A great deal has happened to both men since those early days at St George's School, Weybridge, Surrey. Now, once again, they are together, Bill Matthews having joined Sinclair Research as finance director last September.

"I was working in Toronto last year and Clive had to go there for a Mensa conference. We had lunch and he asked me if I was interested in this job. I thought what the hell, why not? Here I am, thoroughly enjoying it".

The two men, in fact, worked together previously, but in the very early days of Sinclair Radionics. "I think I kept his cash book or something when he was busy packing-up and selling little bits by mail order. It seems a long time ago".

Matthews, now 43 and married with four children, went straight from school to read economics and business administration at Sheffield University. He followed that with training at a firm of accountants in London, qualifying as a chartered accountant in 1963.

The first five years of his career were spent in public accounting in Turkey and Italy. "It was great to be able to travel and, having been released from all that studying, I did a reasonable amount of work but certainly nothing you could call strenuous".

Then followed marriage and the offer of a job with ICI as a group accountant. He spent four years there and still considers it one of the best-run companies for which he has worked.

He moved on to become financial controller for Sony U.K. for two years

> 'He asked me if I was interested in this job. I thought what the hell, why not?'

and was involved in setting-up the company's successful television factory in Wales. Emigration to Canada was the next step, working for management consultants Price Waterhouse. His most recent job, in Houston, Texas, was as executive vice-president of a company with clients from the oil and gas industries.

continued on page 104

continued from page 103

A varied career but one which has always involved him in the use of computers, particularly for management information. The finance department at Sinclair Research is now in the process of computerising its system with an ICL 25. Matthews expects it to be of considerable help in financial reporting and control.

One of his first tasks at Sinclair was to place 10 percent of the company shares with institutional investors, an offer which was well-subscribed. He says:

"We see ourselves getting a Stock Exchange quotation in two years. It is still our intention to keep the company small in terms of the number of people employed; that concept has not disappeared.

"Sales have grown substantially and we have reached a size where we could issue shares and get a public quotation. It will be our coming of age, if you like".

Matthews sees one of his tasks as ensuring that Sinclair has sufficient resources to continue to grow rapidly and

'We have to be careful because the life expectancy of our product is fairly short'

ensuring that those resources are generated from within the company — from its profits. No easy task, he admits.

"Coming from a financial background, you find all companies have a great deal in common. The exceptional thing here is the sheer speed with which we are growing and the dynamism of our research activities.

"It can be a problem to find the resources to cover all that development. It creates its own problems and puts exceptional pressure on everyone who works here but it also creates a much more optimistic attitude among the staff. We tend to pay better than the normal market rates to get good people and it is a marvellous team".

Matthews says the company philosophy will always be to design products which are inexpensive and produced in large volume, thus making them widely-available.

"I think the Sinclair computers are marvellous little machines. We are just seeing the beginning of a revolution in the use of computers. The first stage was to make them so inexpensive that anyone could use them and Clive has certainly done that.

"We have to be careful because the life expectancy of our product is fairly short. You can be fairly sure other firms will catch-up rapidly. We have to make the best use of that technical lead and exploit it fully, to the best possible advantage. We cannot afford to sit still. In three years I do not suppose the ZX-81 will be marketed. We are not making pyjamas for Marks and Spencer after all; that kind of thing you can probably go on selling for about 200 years.

"We must have a stream of new and innovative products all the time and we must remain inventive".

Listening to those exacting standards is tiring but they are the standards which have taken Sinclair to the top so quickly and Matthews has absorbed them with equal speed. Approximately half the staff of Sinclair Research is involved in research and development and Matthews intends to concentrate substantial resources for its continuation, buying new premises and rationalising existing ones.

With Sinclair products tending to be market firsts, Matthews admits there is often a tendency to under-estimate the product. "When sales are restricted they are restricted by the ability to produce rather than lack of demand for the product but one has to be cautious to a certain extent," he says.

"You are making a commitment to the subcontractor, so you have to be careful not to over-estimate the demand. Then the subcontractor has to buy components and perhaps hire people. So you have to be as realistic as you possibly can.

"Producing new concepts means a greater risk element and greater flexibility in financial control. You have to keep re-assessing the situation in financial terms and try to predict what will happen".

Because the Sinclair market is largely domestic it is by nature more volatile than selling to big industry. This is another factor Matthews has to take into consideration. With all that on his mind, Matthews, who displays a Casio calculator on his desk, has not yet had much free time to experiment with the Sinclair products.

His eldest 15-year-old son has compensated for that. He has two Spectrums at home and, his father says, spends most of his time sitting solidly in front of them, lost to the world.

He has has two sisters, aged 12 and 13, and a five-year-old brother, but none is yet showing the same enthusiasm.

Matthews likes to keep fit in his spare time and when I visited him was keenly awaiting the Sinclair half-marathon due in Cambridge on July 17. No newcomer to running, he participated in last year's Boston marathon. Nevertheless he was taking the Cambridge event seriously. So, no doubt, was one of his fellow runners, Sir Clive Sinclair. Their speed, it seems, is not confined to work, nor their competitive spirit.

Matthews is reluctant to predict how long he will stay with Sinclair but says: "The chances are it will be a long time. I am really enjoying it so far and with the effects of recession hitting so many companies, it is fine to work for one as successful as this.

"We have built a very big turnover and we have the financial resources to expand into the future. That all gives the company a great deal of strength".

As part of the Sinclair management



BILL MATTHEWS
'Sinclair computers are marvellous little machines'

team, Matthews attends the monthly meetings of the board, together with Sir Clive, Nigel Searle the production director, and two research directors.

At the moment the board doubles as a management committee which has enabled Matthews to look at every aspect of the company within a short space of time. He likes what he has seen and is full of praise for everyone, from the genius of Sir Clive through the dedication of the rest of the staff down to the excellent quality of the company canteen.

In short, he appears to have been converted and he speaks as if he has been with the company for years. St George's, Weybridge should be proud.

spectrum

NEWS from SPECTRUM

SALE TIME

Most **SPECTRUM** members will be holding their own individual **HOT SUMMER SALES** with **1000's of bargains at super LOW, LOW prices** - check with your local **SPECTRUM** dealer **NOW!** You could be surprised at just how much you can save at **SPECTRUM**

COMMODORE

The **powerful COMMODORE 64 now only £229** from **SPECTRUM** - **a truly superb micro** for **business or personal use.**

ATARI

ATARI 800 & 400 models now at **sensational LOW prices** from **SPECTRUM** - see our ad. for further details

SOFTWARE

See our super range of SOFTWARE from top American & British companies

NEW SPECTRUM MEMBERS

Check our address page! - there are many new **SPECTRUM** dealers throughout the UK so there's a good chance there'll be a **SPECTRUM** centre near you.

PRESTEL

See PRESTEL Page 600181 for up to date information from SPECTRUM

AFTER SALES CARE

SPECTRUM service centres will ensure that should your machine 'go down' **we will get it running again as quickly as possible.** We also offer **extended warranties** at reasonable prices too! - ask your **SPECTRUM HOME COMPUTER CENTRE** for full details.

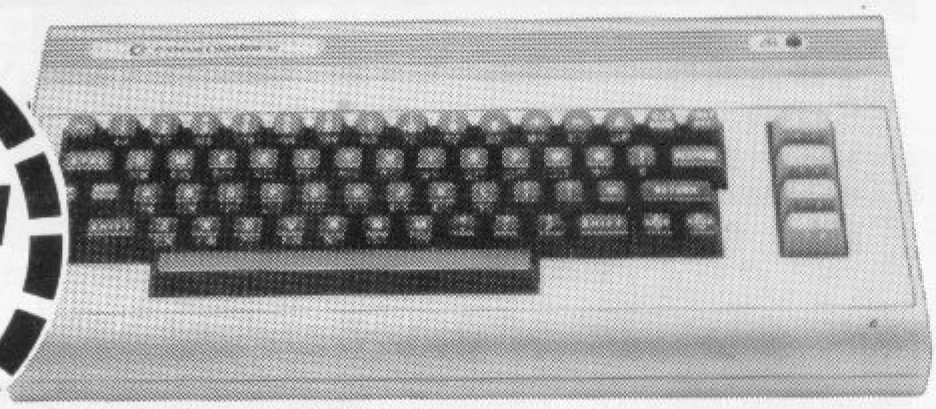
COMPUTER DEALERS

(or prospective Computer dealers!) If, you would like to know more about becoming a **SPECTRUM APPOINTED DEALER** on an exclusive area basis, please write to **MIKE STERN, Spectrum (UK) Ltd., Burrowfield, Welwyn Garden City Herts. or telephone (07073) 34761**

Now a powerful business micro with enormous memory for the price of a games machine. The-

COMMODORE 64

Sensational **NEW LOW PRICE!**



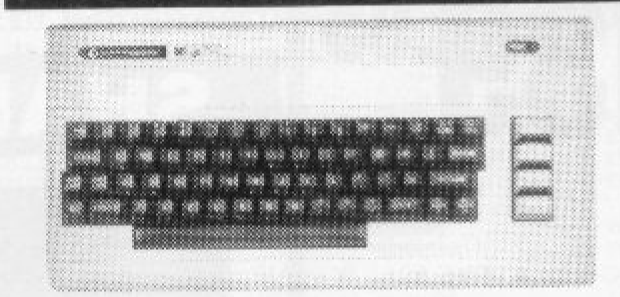
Sensational value at only

£229.00

Just look at this **incredible new price** on the acclaimed **Commodore 64** at Spectrum now! The Commodore 64 comes with an exceptionally **powerful memory - a massive 64K RAM - plus a wide-ranging specification** that makes for **superb versatility**. It's a lot of computer, and quite outstanding value at such a low price. The 64's **features** include: ●**64K RAM** ●**Z80 Processor option** ●**Dedicated video chip** ●**Sprite 3-D graphics** ●**Music synthesiser** ●**Prestel link** ●**High resolution graphics (320X200)** ●**16 colours** ●**And lots more - see your SPECTRUM dealer NOW!**

Disk drive for Commodore 64 ...... £229.00

COMMODORE VIC-20 Package Offer!

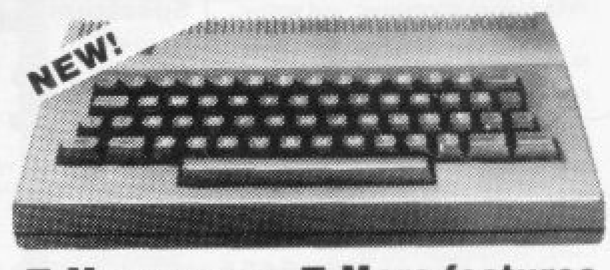


A **complete Home Computer system** including the **VIC-20 Computer, a Cassette Unit, introduction to BASIC part 1 - a simple explanation of computer programs - Blitz, Type-A-Tune, Race & Hop-pit. A fantastic deal!!** and **great value-for-money.** But **HURRY!** offer only while stocks last.

Sensational Value ONLY £139.99

Special new LOW price on VIC-20 cartridge games from only £9.99

LYNX 96K



■ **More power** ■ **More features**

Now from **SPECTRUM** - the new **LYNX 96K** offering **more workspace for ambitious programs.** The most important feature of the 96K machine is its **additional memory.** In full high resolution colour, it provides **37.5K of RAM directly accessible in Basic** - with up to **24K more** available to programs using machine code. Ask to see the **super new LYNX 96K at SPECTRUM - NOW!**

Spectrum Price £299.00

LYNX 48K Model - SPECTRUM PRICE **£225**

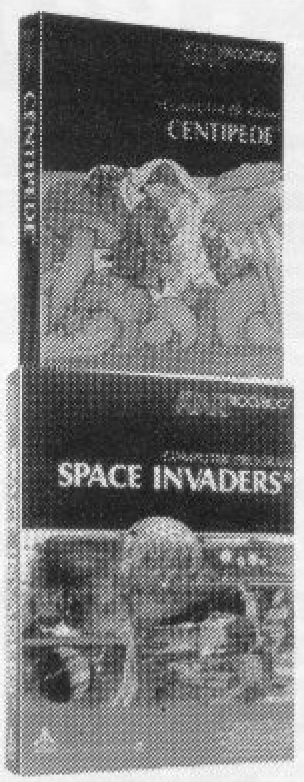
For the Lynx owners who're ready to take the next step, the 48K machine can be upgraded to full 96K specification for just £89.95

TURN THE PAGE FOR MORE SUPER OFFERS FROM SPECTRUM

SOFTWARE

THE TOP SELLERS from SOFTSEL®

American games for the U.K. market from leading American software houses



ATARI
Donkey Kong Atari (Cart) £29.99
Dig Dug Atari (Cart) £30.00

AVALON HILL
Computer Stocks & Bonds Com 64 (Cass) £16.56
Midway Campaign Com 64 (Cass) £16.56
Telengard Atari (Disk) £23.18

BRODERBUND
Choplifter Atari (Disk) £28.93
Apple Panic Atari (Disk) £24.79
AE Atari (Disk) £28.93
Seafox Atari (Disk) £24.79
Bank Street Writer Atari (Disk) £56.31

BIG FIVE SOFTWARE
Miner 2049er Atari (Cart) £41.70

DATASOFT
Zaxxon Atari (Disk) £33.07

EDUCATIONAL SOFTWARE
Tricky Tutorials 1 to 6 Atari (Disk) .... £96.97 (For the 6)

EPYX/AUTOMATED SIMULATIONS
Jump Man Com 64 (Disk) £33.07
Temple of Apshai Atari/Vic 20 (Disk) £33.07

HEYDEN
Sargon 2 Atari (Disk) £28.93
Cass £24.79

HUMAN ENGINEERED SOFTWARE
Turtle Graphics Com 64 (Cart) £49.15
Vic 20 (Cart) £32.75
Heswriter Com 64 (Cart) £36.85
Vic 20 (Cart) £32.75
Predator Vic 20 (Cart) £33.35
CoCo II Com 64 (Disk) £33.07
Vic 20 (Disk) £33.07
Simon Vic 20 (Cass) £13.20
Torg Vic 20 (Cass) £14.85
6502 Professional Development System
Com 64 (Cass) £24.11
Vic 20 (Cass) £24.11

INFOCOM
Zork 1, 2 & 3 Atari (Disk) £33.07
Com 64 (Disk) .... £33.07 (each game)
Deadline Atari (Disk) £41.35
Suspended Com 64 (Disk) £41.35

THE MUSE SOFTWARE
Castle Wolfenstein Atari (Disk) £22.97

LIGHTNING SOFTWARE
Master Type Atari (Disk) £32.16

MIS
Vic Vango Vic 20 (Cass) £10.71
Fruit Fly Vic 20 (Cass) £10.71

PROGRAM DESIGN
Pre-school IQ Builder Atari (Disk) £19.28
Cass £13.77

ROCKLAN
Wizard of Wor Atari (Disk) £33.07
Cart £37.52

SIERRA ON-LINE
Frogger Atari (Disk) £27.27
Com 64 (Disk) £28.93
Ultima II Atari (Disk) £49.63
Crossfire Vic 20 (Cass) £24.79

SIRIUS SOFTWARE
Repton Atari (Disk) £30.64
Com 64 (Disk) £33.07
Fast Eddy Com 64 (Disk) £28.93
Vic 20 (Cart) £33.35
Squish'em Com 64 (Disk) £28.93
Type Attack Vic 20 (Cart) £33.35
Turmoil Vic 20 (Cart) £33.35

SPINNAKER
Story Machine Atari (Disk) £28.14
Rhymes & Riddles Atari (Disk) £24.11
Snooper Troops Atari (Disk) £36.19
Hey Diddle Diddle Atari (Disk) £24.11
In search of the Most Amazing Thing
Atari (Disk) £32.16

The TOP 50 from MICRO DEALER UK

The best of British software from leading British software houses





ZX-SPECTRUM
QUICKSILVA "XADOM" £6.95
QUICKSILVA "AQUAPLANE" £6.95
QUICKSILVA "VELNOR'S LAIR" £6.95
QUICKSILVA "3-D STRATEGY" £6.95
QUICKSILVA "SMUGGLERS COVE" £6.95
IMAGINE "ZZOOM" £5.50
IMAGINE "ZIPZAP" £5.50
ULTIMATE "TRANZ AM" £5.50
ULTIMATE "JET PAC" £5.50
ULTIMATE "PSST" £5.50
ULTIMATE "COOKIE" £5.50
MELBOURNE HOUSE "4-D TERROR-DACTIL" £6.95
MELBOURNE HOUSE "PENETRATOR" £6.95
MELBOURNE HOUSE "THE HOBBIT" £14.95
CRYSTAL COMPUTING "HALLS OF THINGS" £6.50
NEW GENERATION "KNOT IN 33-D" £5.95
PSS "LIGHT CYCLE" £5.95
QUICKSILVA "TIMEGATE" £6.95
QUICKSILVA "A TRADER TRILOGY" £9.95
QUICKSILVA "ASTRO BLASTER" £4.95
QUICKSILVA "FRENZY" £4.95
RICHARD SHEPHERD "TRANSYLVANIAN TOWER" £6.50
MICROSPHERE "OMNICALC" £9.95
PICTURESQUE "EDITOR/ASSEMBLER" £8.50
PICTURESQUE "SPECTRUM MONITOR" £7.50

COMMODORE 64
LLAMASOFT "MATRIX 64" £7.50
LLAMASOFT "LAZER ZONE" £7.50
LLAMASOFT "GRIDRUNNER 64" £5.00
LLAMASOFT "MUTANT CAMELS" £7.00
INTERCEPTOR "CRAZY KONG" £7.00
POSTERN "SHADOWFAX" £7.99

VIC 20
LLAMASOFT "MATRIX" £6.00
LLAMASOFT "GRIDRUNNER" £5.00
LLAMASOFT "LAZER ZONE" £6.00
QUICKSILVA "SKYHAWK" £7.95
QUICKSILVA "SUB-SPACE STRIKER" £7.95
INTERCEPTOR "CRAZY KONG" £6.00

BBC
PSION "VU-CALC" £14.95
PSION "VU-FILE" £14.95
QUICKSILVA "BEEB-ART" £14.95
QUICKSILVA "MUSIC PROCESSOR" £14.95
SOFTWARE INVASION "3-D BOMB ALLEY" £7.95
DIGITAL FANTASIA "WIZARD OF ACKRYZ" £9.95
QUICKSILVA "PROTECTOR" £7.95
POSTERN "SHADOWFAX" £7.99

DRAGON 32
SALAMANDER "GRIDRUNNER" £7.95
PSS "ATTACK!" £7.95
SALAMANDER "DRAGON TREK" £9.95

ORIC
IJK SOFTWARE "XENON-1" £8.50
IJK SOFTWARE "3-D MAZE" £7.50
PSS "INVADERS" £6.95
PSS "CENTIPEDE" £6.95

Compiled by Micro Dealer U.K. Distributors of fast-selling Micro Computer Software

Plus! THE BEST SELLERS

from these top British Software houses

SUNSHINE
Cruising (Dragon 32) £6.95
Cruising (ZX Spectrum) £4.95
Blind Alley (ZX Spectrum) £4.95
Androids (ZX Spectrum) £5.95
Galaxy Attack (ZX Spectrum 48K) £5.95
Sword Fight (ZX Spectrum) £5.95

RABBIT

Cyclons - Commodore 64 .... £5.99
Escape MCP - Commodore 64 .... £5.99
Pakacuda - Commodore 64 .... £5.99
Paratrooper - Vic 20 .... £5.99
Annihilator - Commodore 64 .... £5.99
Pakacuda - Vic 20 .... £5.99
Race Fun - Vic 20 .... £5.99
Anti-Matter Splatter - Vic 20 .... £5.99
Cyclons - Vic 20 .... £5.99
The Catch - Vic 20 .... £5.99

COMPUTER RENTALS

High Resolution (ZX-81) £5.95
Galactic Patrol (Spectrum 16K) £5.95
For Spectrum 48K:
Derby Day £5.95
Rescue £5.95
Jackpot £4.95
Testmatch £5.95
Handicap Golf £5.95
Alien Maze £5.95
3D Desert Patrol £4.95
St. George & the Dragon (Dragon 32) £6.95

MICRODEAL

DRAGON
The King £8.00
Space War £8.00
Defence £8.00
Alcatraz £8.00
Katerpillar Attack £8.00
Space Monopoly £8.00
Mansion Adventure £8.00

MIKROGEN

Mikrogen
Bomber (ZX81) £3.95
Scramble (ZX81) £3.95
Space Invaders (ZX81) £3.95
Frogs (ZX81) £3.95
ZX Chess (ZX81) £6.50
Masterchess (Spectrum) £6.95
Scramble (Spectrum) £5.95
Space Zombies (Spectrum) £5.95
Panic (Spectrum) £5.95
Mad Martha (Spectrum £6.95

BOOKS

GRANADA PERSONAL COMPUTING TITLES
The ZX Spectrum and how to get the most from it £5.95
The Spectrum Programmer £5.95
The Spectrum Book of Games £5.95
Introducing Spectrum Machine Code £7.95
The Apple II Programmer's Handbook £10.95
Programming with Graphics £5.95
The Dragon & how to make the most of it £5.95
Computing for the Hobbyist & small Business £6.95
Simple Interfacing Projects £6.95
The BBC Micro: An expert guide £6.95
Commodore 64 Computing £5.95
The Oric-1 and how to get the most from it £5.95
The Dragon 32 book of games £5.95
Computer Languages and their uses £5.95
Lynx Computing £6.95
21 Games for the BBC Micro £5.95
Choosing a Microcomputer £4.95
Databases for fun & profit £5.95
Introducing the BBC Micro £5.95

SUNSHINE
The Working Spectrum £5.95
Functional Forth for the BBC £5.95
The Working Dragon 32 .... £5.95
Dragon 32 Games Master £5.95
The Working Commodore 64 .... £5.95
Commodore 64 Machine Code Master £6.95
The Working Dragon £5.95
The Working Spectrum £5.95
The Working CBM 64 .... £5.95
Dragon 32 Games Master £5.95
Functional Forth for the B.B.C. £5.95
Androids for the 16K Spectrum £5.95
Sword Fight for 16K Spectrum £5.95
Galaxy Attack for 48K Spectrum £5.95
Blind Alley for 16K Spectrum £5.95
Cruising for 16K Spectrum £5.95

PRENTICE HALL
The Apple Personal Computer for Beginners £6.95
Atari Games and Recreation £12.70
BASIC Programming on the BBC Microcomputer £5.95
The ZX Spectrum - Your Personal Computer £5.95
Commodore 64 Programmer's Reference Guide £14.95
The PET Personal Computer for Beginners £5.95
VIC 20 Programmer's Reference Guide £9.95
Osborne User's Guide £12.70
The C Programming Language £16.95
Starting FORTH £15.25

ACCESSORIES

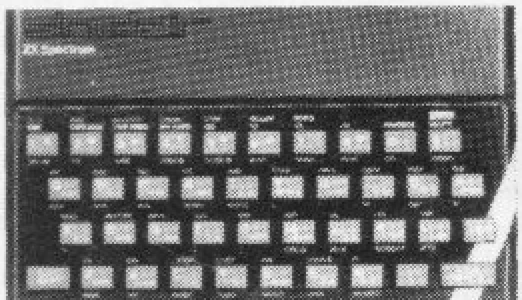
C12 DATA CASSETTES £0.50
C15 DATA CASSETTES £0.58
VISCOUNT SINGLE SIDED, DOUBLE DENSITY (10) (FOR APPLE, COMMODORE, ATARI, TANDY) £21.25
VISCOUNT SINGLE SIDED, SINGLE DENSITY (10) £21.25
VISCOUNT DOUBLE SIDED, DOUBLE DENSITY (10) (FOR SHARP SUPERBRAIN, ETC.) £33.81
VISCOUNT SINGLE SIDED DOUBLE DENSITY 96 TRACK (10) (FOR NASCOM, COMMODORE 8050, ETC.) £51.36
EMPTY DISK CASES (FOR 5¼" DISKETTES) £1.95
DISK HEAD CLEANER KIT £16.10
TELEVISIONS
12" T80 B&W PORTABLE £59.95
CTP3131 14" COLOUR PORTABLE £229.95

Viscount — **Teach yourself BASIC cassette available for most popular micros - all £4.95**

TURN THE PAGE FOR MORE SUPER OFFERS FROM SPECTRUM

spectrum

SINCLAIR ZX SPECTRUM



This top selling micro is now available from Spectrum in both **16K** and **48K RAM.**

SINCLAIR ZX SPECTRUM 16K	SINCLAIR ZX SPECTRUM 48K
£99.95	**£129.95**

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

Just look at this fantastic range of add-on goodies for the ZX Spectrum!

VISCOUNT 32K RAM PACK............ **£39.95**

SPECTRUM/TV SOUND UNIT
Control sound of your ZX-Spectrum through volume control on T.V. only **£9.95**

Fuller
MASTER UNIT
Combines all the features of both ORATOR and the FULLER BOX at the amazingly low price of
ONLY **£54.95**

THE AMAZING FULLER BOX
Features: Programmable Sound, Joystick Controller, Cassette Interface, Beep Amplifier, Thro Buss, Volume Control
ONLY **£29.95**

ORATOR VOICE SYNTHESIS FOR ZX SPECTRUM
ONLY **£39.95**

Fuller
FD 42 KEYBOARD FOR ZX81 SPECTRUM
ONLY **£29.95**

Fuller
16K RAM
ONLY
£24.95

Fuller
SPECTRUM SOUND AMPLIFIER
ONLY **£6.95**

DIGITAL TRACER
from RD Labs

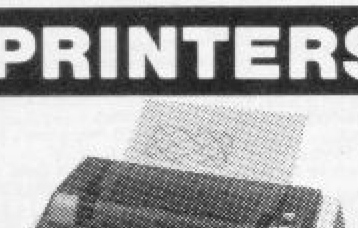


SPECTRUM PRICE **£55.50**

ZX-81 ACCESSORIES

64K RAM Pack....£54.95
16K RAM Pack....£24.95
ZX Printer £39.95

PRINTERS



EPSON
Model FX-80............ **£503.70**
Model RX-80 .... **£332.35**
SEIKOSHA
GP-100A................ **£229.94**
GP-100VC.............. **£247.25**
SMITH CORONA
Model TP-1A............ **£431.25**
OKI MICROLINE
Model 80.................. **£259.90**
Model 82A................ **£455.40**
Model 92P................ **£585.35**
All prices include VAT

MONITORS



SANYO CDD 3125NB
Colour Monitor
£286.35

SANYO 12"
Green Monitor
£113.85
All prices inc. VAT

THE PLUG

Ever had your micro crash on you when you were in the middle of a complex program because some other electrical appliance was switched on and caused a power fluctuation? THE PLUG is designed especially to overcome this problem.

only **£14.95**

ATARI 800

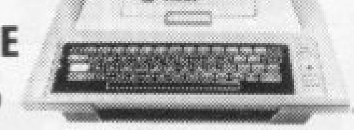


Fantastic! **NEW LOW** Price

Now this proven and tested machine has been upgraded to a massive **48K RAM** and its still at the amazing **LOW** price of**£299.95** from **SPECTRUM.** It's an ideal Home Micro for graphics, educational and personal finance etc. use it and it will take you from learning up to a small business use. You can add printers, program recorders, disk drives and more, to expand your micro as and when you want, to suit your needs. So if you're looking for a top of the line micro you must see the **ATARI 800** with **48K** at **SPECTRUM - NOW!**

SUPER NEW LOW PRICE £274.95

ATARI 400
16K RAM
NEW LOW PRICE
£136.95

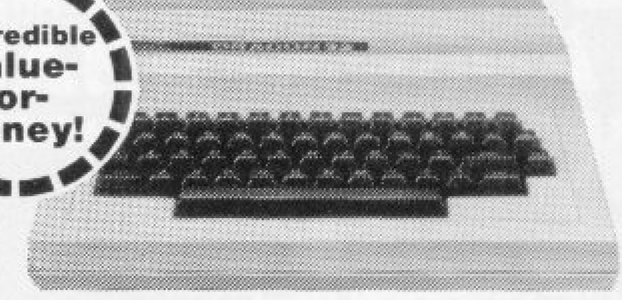


Including FREE Programming Kit

Plus a wide range of other peripherals & software for ATARI from your local SPECTRUM dealer - See our SOFTWARE page!

DRAGON

Incredible Value-for-Money!



Extensive facilities include highly advanced colour graphics. Powerful standard 32K RAM (expandable to 64K Bytes). ● 9 Colour 5 resolution Display ● Extended Microsoft colour BASIC (as standard) ● Advanced sound with octaves -255 tones.

SPECTRUM FACTS

Maximum user RAM ....29,679 Bytes
Text Screen ....16 x 32
High resolution.....256 x 192
Cassette Lead ......Included
VISCOUNT Teach yourself Dragon Basic...........£6.95

CHECK WITH YOUR LOCAL SPECTRUM DEALER NOW FOR OUR SUPER LOW PRICE

Plus a wide range of other peripherals & software for DRAGON from your local SPECTRUM dealer -See our SOFTWARE page!

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

There's a Spectrum Centre near you . . .

AVON

BATH Software Plus, 12 York St. TEL: (0225) 61676

BRISTOL Brensal Computers Ltd., 24 Park Row. TEL: (0272) 294188

WESTON-SUPER-MARE K. & K. Computers, 32 Alfred St. TEL: TBA

BEDFORDSHIRE

BEDFORD Stanad Ltd., 115 Midland Rd. TEL: (0234) 49341

DUNSTABLE Dormans, 7-11 Broad Walk. TEL: (0582) 65515

LEIGHTON BUZZARD The Computer Centre at Milton Keynes Music, 17 Bridge St. TEL: (0525) 382504, 376622

LUTON Terry-More, 49 George St. TEL: (0582) 23391/2

BERKSHIRE

READING David Saunders, 8 Yield Hall Place. TEL: (0734) 580719

WINDSOR Wycombe Video, 44 King Edward Court. TEL: (07535) 67441

BUCKINGHAMSHIRE

CHESHAM Reed Photography & Computers, 113 High St. TEL: (0494) 783373

CAMBRIDGESHIRE

CAMBRIDGE K. P. Ltd., 12a Kings Parade. TEL: (0223) 68087

PETERBOROUGH Peterborough Communications, 91 Midland Rd. TEL: (0733) 41007

CHANNEL ISLANDS

GUERNSEY Grut's, 3-5 The Pollet, St. Peter Port. TEL: (0481) 24682

JERSEY Audio & Computer Centre, 7 Peter St. St. Helier. TEL: (0534) 74000

CHESHIRE

ALTRINCHAM Mr. Micro, 28 High St. TEL: TBA (Phone (061) 728 2282 for info.)

CREWE Microman, Unit 2, 128 Nantwich Rd. TEL: (0270) 216014

CHESTER Oakleaf Computers Ltd., 100 Boughton. TEL: (0244) 310099

MACCLESFIELD Camera & Computer Centre, 118 Mill St. TEL: (0625) 27468

NORTHWICH Camera & Computer Centre, 3 Town Sq. TEL: (0606) 45629

STOCKPORT Wilding Ltd., 1 Little Underbank. TEL: (061) 480 3435

WARRINGTON Wildings, 111 Bridge St. TEL: (0925) 38290

WIDNES Computer City, 78 Victoria Rd. TEL: (051) 420 3333

WILMSLOW Swift of Wilmslow, 4-6 St. Annes Parade. TEL: (0625) 526213

CLEVELAND

MIDDLESBROUGH McKenna & Brown, 190 Linthorpe Rd. TEL: (0642) 248345

CORNWALL

ST. AUSTELL A B & C Computers, Duchy House, 6 Lower Aylmer Sq. TEL: (0726) 64463

CUMBRIA

BARROW-IN-FURNESS Barrow Computer Centre, 96 Church St. TEL: (0229) 38353

CARLISLE The Computer Shop, 56-58 Lowther St. TEL: (0228) 27710

WHITEHAVEN P. D. Hendren, 15 King St. TEL: (0946) 2063

DERBYSHIRE

ALFRETON Gordon Harwood, 69/71 High St. TEL: (0773) 832078

DERBY C T Electronics, at Camera Thorpe, The Spot. TEL: (0332) 360456

DEVON

EXMOUTH Open Channel, 30 The Strand, TEL: (03952) 4408

PAIGNTON Devon Computers, 81 Upper Manor Rd. TEL: (0803) 526303

DURHAM

DARLINGTON McKenna & Brown, 102 Bondgate. TEL: (0325) 59744

ESSEX

BASILDON Godfrey's 28-32 East Walk, Town Centre. TEL: (0268) 289379

CHELMSFORD Maxton Hayman Ltd., 5 Broomfield Rd. TEL: (0245) 354595

GRAYS H. Reynolds, 79 Orsett Rd. TEL: 0375 5948

ILFORD Woolfmans, 76 Ilford Lane. TEL: (01) 478 1307 (Opening Soon)

LOUGHTON Micro & Movie Channel, 309 High Rd. TEL: (01) 508 1216

GLOUCESTERSHIRE

GLOUCESTER The Model Shop, 79-81 Northgate St. TEL: (0452) 410693

HAMPSHIRE

ALDERSHOT David Saunders, 51 Station Rd. TEL: (0252) 20130

BASINGSTOKE Fisher's, 2-3 Market Place. TEL: (0256) 22079

PORTSMOUTH Computer Corner, 261 Commercial Rd. TEL: (0705) 833938

PORTSMOUTH Waterlooville G B Microland, 7 Queens Prde. TEL: (07014) 59911

SOUTHAMPTON R. J. Parker & Son Ltd., 11 Portsmouth Rd., Woolston. TEL: (0703) 434137/8

WINCHESTER Winchester Camera & Computer Centre, 75 Parchment St. TEL: (0962) 53982 (Just Opening)

HEREFORD

HEREFORD Melgray Hi-Tech Ltd., 49 Broad St. TEL: (0432) 275737

HERTFORDSHIRE

HATFIELD Microworld, 2 Crawford Rd. TEL: (07072) 64137

HEMEL HEMPSTEAD Faxminster Ltd., Computer & Electrical Discount Centre, 25 Market Sq. TEL: (0442) 55044

HITCHIN Camera Arts (Micro Computer Division), 68a Hermitage Rd. TEL: (0462) 59285

POTTERS BAR The Computer Shop, 197 High St. TEL: (0707) 44417

ST. ALBANS (Herts) Clarks Computer Centre, 14/16 Holywell Hill. TEL: (0727) 52991

STEVENAGE D. J. Computers, 11 Town Sq. TEL: (0438) 65501

WATFORD SRS Microsystems Ltd., 94 The Parade, High St. TEL: (0923) 26602

HUMBERSIDE

GRIMSBY R. C. Johnson Ltd., 22 Friargate, Riverhead Centre. TEL: (0472) 42031

ISLE OF MAN

DOUGLAS T. H. Colebourn Ltd., 57-61 Victoria St. TEL: (0624) 3482 (Just Opening)

KENT

CANTERBURY Kent Micro Systems, Conquest House, 17 Palace St. TEL: (0227) 50200

ORPINGTON Ellis Marketing Ltd., 25 Station Sq., Petts Wood. TEL: 0689 39476

RAINHAM Microway Computers Ltd., 39 High St., Medway Towns. TEL: (0634) 376702

SEVENOAKS Ernest Fielder Computers, Dorset St. TEL: (0732) 456800

SITTINGBOURNE Computers Plus, 65 High St. TEL: 0795 25677

TUNBRIDGE WELLS Modata Computers Ltd., 28-30 St. Johns Rd. TEL: 0892 41555

LANCASHIRE

ACCRINGTON PV Computers, 38A Water St. TEL: (0254) 36521/32611

BLACKBURN Tempo Computers, 9 Railway Rd. TEL: 0254 60554

BURNLEY IMO Computer Centre, 39-43 Standish St., BB11 1AP. TEL: (0282) 54299

BURY (Lancs.) Micro-North, 7 Broad St. TEL: (061) 797 5764

OLDHAM Home & Business Computers Ltd., 54 Yorkshire St. TEL: (061) 633 1608

PRESTON Wilding's 49 Fishergate. TEL: (0772) 556250

ROCHDALE Home & Business Computers, 75 Yorkshire St. TEL: TBA

LEICESTERSHIRE

LEICESTER Youngs, 40/42 Belvoir St. TEL: (0533) 544774

MARKET HARBOROUGH Harborough Home Computers, 7 Church St. TEL: (0858) 63056

LINCOLNSHIRE

GRANTHAM Oakleaf Computers Ltd., 121 Dudley Rd. TEL: (0476) 76994/70281

LINCOLN MKD Computers, 24 Newlands. TEL: (0522) 25907

LONDON

E6 Percivals, 85 High St. North, East Ham. TEL: (01) 472 8941

E8 McGowans, 244 Graham Rd., Hackney. TEL: (01) 533 0935

EC2 Devron Computer Centre, 155 Moorgate. TEL: (01) 638 3339/1830

N14 Logic Sales, 19 The Broadway, The Bourne, Southgate. TEL: TBA

N20 Castlehurst Ltd., 1291 High Rd. TEL: (01) 446 2280

NW4 DA Vinci Computer Store, 112 Brent St., Hendon. TEL: (01) 202 2272/3/4 (Just Opening)

NW9 Moviescope, 459 Kingsbury Rd. TEL: (01) 204 6352

SE1 Vic Odden's, 6 London Bdg Walk. TEL: (01) 403 1988

SE9 Square-Deal, 375 Footscray Rd., New Eltham. TEL: (01) 859 1516

SE15 Castlehurst Ltd., 152 Rye Lane, Peckham. TEL: (01) 639 2205

SW6 Chelsea Micros Ltd., 14 Jerden Place. TEL: (01) 385 8494

W1 Devron 4 Edgware Rd. TEL: (01) 724 2373

W1 Computers of Wigmore Street, 87 Wigmore St. TEL: (01) 486 0373

W1 Sonic Foto & Micro Center, 256 Tottenham Court Rd. TEL: (01) 580 5826

W3 Colormatic Computers, 44 High St., Acton. TEL: (01) 992 7611

W11 Electroleisure, 120 Notting Hill Gate. TEL: (01) 221 7029

MANCHESTER GREATER

MANCHESTER Lomax Ltd., 8 Exchange St., St. Ann's Sq. TEL: (061) 832 6167

SWINTON Mr. Micro Ltd., 69 Partington Lane. TEL: (061) 7282282 Open Friday until 8 p.m.

HYDE Pase, 213-215 Market St. TEL: (061) 366 5935

BOLTON Wilding Ltd., 23 Deansgate. TEL: (0204) 33512

WIGAN Wilding Ltd., 11 Mesnes St. TEL: (0942) 44382

MERSEYSIDE

HESWALL Thornguard Computer Systems, 46 Pensby Rd. TEL: (051) 342 7516

LIVERPOOL Beaver Radio, 20-22 Whitechapple. TEL: (051) 709 9898

LIVERPOOL (Aintree) Hargreaves, 31/37 Warbreck Moor. TEL: (051) 525 1782

SOUTHPORT Central Computers, 575 Lord St. TEL: (0704) 31881

MIDDLESEX

EDGWARE Breaker 1-4, 130 High St. TEL: (01) 952 7488/8860

HARROW Camera Arts (Micro Computer Division, 24 St. Ann's Rd. TEL: (01) 427 5469

HAYES Chipstop, 1000 Uxbridge Rd. TEL: (01) 573 2511 (Just Opening)

TEDDINGTON Teddington Camera Centre, Broad St. TEL: (01) 977 4716

NORFOLK

NORWICH Sound Marketing, 52 St. Benedicts St. TEL: (0603) 667725

THETFORD Thetford C B & Micros, 21 Guildhall St. TEL: (0842) 61645

NORTHANTS

NORTHAMPTON Basic Computers & Systems Ltd., 72 Kingsthorpe Hollow. TEL: (0604) 710740

NOTTINGHAMSHIRE

NOTTINGHAM Cameo Computers, 8/9/10 Trinity Walk. TEL: (0602) 42912

NOTTINGHAM Basic, 39-41 Trent Boulevard, West Bridgeford. TEL: (0602) 819713

NORTHERN IRELAND

BELFAST Arthur Hobson Ltd., 37 Gt. Victoria St. TEL: (0232) 246336

LONDONDERRY Foyle Computer Systems, 3 Bishop St. TEL: (0504) 268337

OXFORDSHIRE

ABINGDON Ivor Fields Computers, 21 Stert St. TEL: (0235) 21207

BANBURY Computer Plus, 2 Church Lane. TEL: (0295) 55890

OXFORD Ivor Fields, 7 St. Ebbes St. TEL: (0235) 21207

SCOTLAND

ABERDEEN North East Computers, 1-3 Ellis St., Peterhead. TEL: (0779) 79900

DUMFRIES Vennals, 71 English St. TEL: (0387) 4547

EDINBURGH The Silicon Centre, 6-7 Antigua St. TEL: (031) 557 4546

GLASGOW Victor Morris Ltd., 340 Argyle St. TEL: (041) 221 8958

HAMILTON Tom Dickson Computers, 8-12 Cadzow St. TEL: (0698) 283193

KILMARNOCK Vennals, 49 Foregate. TEL: (0563) 32175

KIRKCALDY Kirkcaldy Photographic Services, 254E High St., Fife. TEL: (0592) 204734

STIRLING R. Kilpatrick, 58 Port St. TEL: (0786) 5532

SHROPSHIRE

SHREWSBURY Computerama, 13 Castlegate. TEL: TBA

SOMERSET

TAUNTON Grays, 1 St. James St. TEL: (0823) 72986

STAFFORDSHIRE

STAFFORD, Computerama, 59 Forgate St. TEL: (0785) 41899

STOKE-ON-TRENT Computerama, 11 Market Sq., Arcade, Hanley. TEL: (0782) 268620

SUFFOLK

BURY ST. EDMUNDS Bury Computer Centre, 11 Guildhall St. TEL: (0284) 705772

IPSWICH Brainwave, 24 Crown St. TEL: (0473) 50965

LOWESTOFT John Wells, 44 London Rd., North. TEL: (0502) 3742

SURREY

CAMBERLEY Camera Arts (Micro Computer Division), 36 High St. TEL: (0276) 65848

CHERTSEY Chertsey Computer Centre, 1 Windsor St. TEL: (09328) 64663

CROYDON Cadcom Ltd., 96 Whitgift Centre (Next door to MacDonald's) TEL: (01) 686 8393

GUILDFORD The Model Shop, 23 Swan Lane. TEL: (00772) 0483 39115

HASLEMERE Haslemere Computers, 25 Junction Place, adj. Rex Cinema. TEL: (0428) 54428

NEW MALDEN Surrey Micro Systems, 31 High St. TEL: (01) 942 0478

WALLINGTON Surrey Micro Systems Ltd., 53 Woodcote Rd. TEL: (01) 647 5636

WOKING Harpers, 71/73 Commercial Way. TEL: (04862) 61061

SUSSEX

BRIGHTON Capricorn, 1 Queens Rd. TEL: (0273) 29634

LITTLEHAMPTON Alan Chase Ltd. 39 High St. TEL: (09064) 5674/4545

TYNE & WEAR

NEWCASTLE-ON-TYNE Newcastle Camera & Computer Mart, 16 Northumberland Ct. TEL: (0632) 327461

WALES

ABERYSTWYTH AberData at Galloways, 23 Pier St. TEL: (0970) 615522

CARDIFF Randall Cox, 18/22 High St. Arcade. TEL: (0222) 31960

NEWPORT (Gwent) Randall Cox, 118 Commercial St. TEL: (0633) 67378

PEMBROKE Randall Cox, 19 Main St. TEL: (064) 668 2876

PORT TALBOT Micro Gen, 6 Royal Buildings, Talbot Rd. TEL: (0639) 887730

WREXHAM T E Roberts, 26 King St. TEL: (0978) 364404/364527

WARWICKSHIRE

LEAMINGTON SPA IC Computers, 43 Russell St. TEL: (0926) 36244 (Opening Soon)

RUGBY The Rugby Micro Centre, 9-11 Regent St. TEL: (0788) 70522

WEST MIDLANDS

BIRMINGHAM Sherwoods, Gt. Western Arcade. TEL: (021) 236 7211

COVENTRY Coventry Micro Centre, 33 Far Gosford St. TEL: (0203) 58942

DUDLEY Computer World, 35 Churchill Precinct. TEL: 0384-238169

WEST BROMWICH Bell & Jones, 39 Queens Sq. TEL: (021) 553 0820

WORCESTER

WORCESTER David Waring Ltd., 1 Marmion House, High St. TEL: (0905) 27551

YORKSHIRE

BRADFORD Erricks Foto-Sonic House, Rawson Sq. TEL: (0274) 309266

HUDDERSFIELD Richards (formally Lawries) 12 Queen St. TEL: TBA

HULL The Computer Centre (Humberside) Ltd., 26 Anlaby Rd. TEL: (0482) 26297

LEEDS Bass & Bligh, 4 Lower Briggate. TEL: (0532) 454451

SHEFFIELD Superior Systems Ltd., 178 West St. TEL: (0742) 755005

SKIPTON Look & See, 45 Belmont Bridge. TEL: 0756 60078

YORK York Computer Centre, 7 Stonegate Arcade. TEL: (0904) 641862

NEW
SPECTRUM MEMBERS

Check **your area** there are many new **SPECTRUM** dealers throughout the **U.K.** So there's a good chance there'll be a **SPECTRUM** centre near you!

Not all stores carry every advertised item, please phone before making a journey — Prices correct at time of going to press E. & O.E.

contrast

USER-EVALUATED* software

ADVENTURE ISLAND (48K Spectrum) £4.95

A clever and entertaining adventure with good graphics and sound effects as you romp around the island trying to rescue a fair maiden from the evil Dr Marko, assailed by all manner of deadly creatures—great fun! Plus **Munchman**—an excellent variation of the arcade game—and **Outline**—an excitingly different, addictive chase with 6 screens, 5 skills, Hall of Fame, full brilliant colour and sound.

LAZATRON (48K Spectrum) £4.95

When you've had enough of playing on your own against the computer, enjoy these refreshingly different **two-player** arcade games with full colour and sound. In **Lazatron** you battle to annihilate your opponent with the deadly trail of your lite bike before he does the same to you. **Mazechase** is a great 2-player action game in which one of you finds out what it feels like to be the ghost for a change!

PAWNCHESS (16K/48K Spectrum) £4.95

A completely new game rather akin to chess played only with pawns, inspiringly created by one of the country's top programmers. It's truly addictive, whether you're a chess player wanting to refine your pawn play, or a beginner who finds the full game too involved. On-screen clock, evaluation of moves, strong multi-level play, sound effects, graphic board etc—100% machine-code gives instant reactions.

PONTOON (48K Spectrum)* £4.95

Even non-card players will quickly become addicted to this! Your Spectrum is the dealer in the game also known as vingt-et-un, and you gamble on whether your cards or the bank's will total nearer 21. Includes full, clear screen instructions, a running total of winnings, and an interrupted game may be re-started. Plus **Cribbage**—a refined simulation of 2-handed crib—and a stunning brain-teaser **Mastermind.**

HANOI KING (48K Spectrum) £4.95

An ingenious and addictive problem of logic involving the transfer of coloured rings between pillars. Start at the simplest level (only 7 moves to win) and progress to the hardest which needs a minimum of 511 moves—the most intriguing puzzle since Rubik's cube! The computer will even run through all 511 moves if you wish. Instant key response and full sound and colour make it really fun to play. Plus **Angles**—another challenging strategy game which becomes increasingly difficult.

TAPE HEADER READER (16/48K Spectrum)

Invaluable to every enthusiast for indexing, memory calculation or simply probing the mysteries of an unknown machine-code program. Load first this tape, then any other; by "reading" the header (first few seconds of the tape) it reveals on screen or printer the name, start line, individual and total bytes used, cassette loading time, and (if m/c) the code block name, start address and length. Will print out a long tape of programs for indexing by itself. Screen instructions. **£5.95**

MICROPEN (16K/48K Spectrum) £5.95

All the features you expect from a powerful professional word-processor, for 16K or 48K Spectrum: on-screen cursor editing with automatic paragraph reformatting; scroll up, down and reposition; search/edit a given word throughout; optional automatic wordwrap and right-margin justification; save, reload and print with double-screen option; instant recall of instructions without loss of text.

COMPOSER (48K Spectrum) £5.95

A very comprehensive and yet easy-to-use program for composing and saving tunes. It produces a 3-octave or 7-octave keyboard for any composition up to 199 elements (notes and pauses); notes are all heard, but not recorded in memory unless "enter" is pressed. Full screen instructions can be recalled at any time, with an 18-function menu for easy editing, rather like a musical word-processor. Tunes can be saved, screen listed or printud.

TEXT (16K ZX81) £5.95

Transform your ZX81 into an incredibly versatile word processor with this powerful, 100% machine-code program. Amazing selection of 15 on-screen routines include all the usual editing and justifying features plus useful extra functions like search-and-replace, moving blocks of text around etc. Capacity up to 350 lines (11,200 characters)! Fully independent load and save; immediate access to "help" page makes it all easy.

UTILITY (16K ZX81) £5.95

A wide range of menu-operated functions in easy-to-use subroutines which you can call up or save within your own programs to make them more powerful and versatile: count remaining bytes, line renumber, alphabetical sorting, numerical sorting, auto-save your program, read machine-code, and text editor (avoids split words at end of line). Clear, helpful instructions—an outstandingly useful program.

THE SIEGE OF FORT APACHE (16K ZX81)

Defend your garrison against marauding red Indians by skilfully deploying your troops and other limited resources. Should you go all-out for an attack and leave the fort undefended? An unusual and stimulating adventure which really keeps you on your toes! **£4.95**

THE WORLD OF ILLUSIONS (16K ZX81)

Enter the incredible World of Illusions, along with your ever-faithful Robot Class 689 (Jimmy to you), and use your intelligence and logic (not to mention your laser gun) to assemble the equipment needed to overcome the evil Doctor Brock and his terrifying giant bats which dive realistically at you! Exciting action, variable levels of difficulty. **£4.95**

*Pontoon not available to customers in Europe.

*Guarantee**

CONTRAST SOFTWARE is independently evaluated prior to distribution by members selected from a 1500-strong panel of discriminating micro users like yourself. Analysis of their scores and suggestions ensures that only programs of the very highest popularity are accepted. Try one and discover its extra quality for yourself; we are confident enough to offer a 7-day free exchange option for any other in our range (in addition to your full legal rights) if you buy by post and you are not absolutely delighted.

You'll find CONTRAST software at many dealers—look for the distinctive glossy black-and-white pack—or you can order direct, post free.

contrast SOFTWARE Farnham Road, West Liss, Hants GU33 6JU

NAME..

ADDRESS..

....

....

Please rush me:

SU

I enclose cheque/Postal Order for £ ....

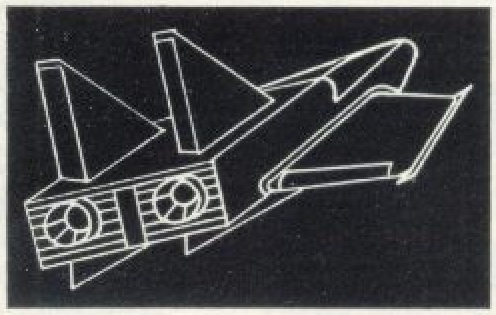
SOLARIS

SUPERB NEW GRAPHIC ADVENTURE FOR THE 48K SPECTRUM

Full Colour 3-D Hi-Res Graphics
Scrolling Text Window
Over 100 Locations
Save Game Feature
Sound
Two Full 48K Programs

Only £6.95 Inc.

DEALER ENQUIRIES WELCOME



Aboard the prison ship Penitentiary, on route to a life sentence on the planet Solaris, your task is clear: Escape from the ship, search the barren wastes of Solaris for the convict settlement. Once there you must win over the convicts and lead the Solaris Rebellion thus gaining ultimate freedom.

CAN YOU SURVIVE?

Softel

SOFTEL
5 Durward Drive
Glenrothes
Fife KY6 2LB
Scotland.

COMPUTER SHOWS NORTHERN

present a

ZX FAIR

at the

MERCURY HOTEL, GARFORTH, LEEDS

BANK HOLIDAY SUNDAY
August 28th 10.00am-5.00pm

Featuring a wide range of Software/Hardware Add-ons for the ZX81 — Spectrum

AA SIGNPOSTED
5 MINS FROM A1 & M62 (JUNC. 30)
AMPLE FREE PARKING
REFRESHMENTS AVAILABLE
FREE SHUTTLE SERVICE FROM GARFORTH RAILWAY STN. TO THE FAIR

A GREAT DAY OUT FOR ALL THE FAMILY



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 112

GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.

Bug — an error in a program.

EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultra-violet light. The memory can then be re-programmed using an electrical device called an EPROM blower.

Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.

Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.

Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.

Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.

Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.

Port — a link to the outside world which can be used by programs and the computer.

PCB — printed circuit board. A board which has on it the electronic circuits of the computer.

RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.

ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.

Software — programs which control the operation of the computer.

Syntax error — a bug caused by incorrect use of a programming language.

continued from page 111

able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is that important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD " " followed by NEWLINE; then increase the volume of the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then re-wind the tape, the program should LOAD normally.

LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.



BUFFER MICRO SHOP

310 STREATHAM HIGH ROAD, LONDON SW16 6HG
Tel: 01–769 2887

Open Tues–Sat 10.30 am to 5.30 pm (Closed Mondays)

SOFTWARE FROM ALL THE BEST SUPPLIERS—OVER THE COUNTER—PLUS GROWING RANGE OF PERIPHERALS. SEE IT 'N TRY IT BEFORE YOU BUY IT.

SAE appreciated for catalogue—but please specify for which computer.

DRAGON ZX-81 ZX SPECTRUM

THE WORLD'S GREATEST RANGE OF
SINCLAIR SOFTWARE
PIONEERS IN 1981—WAY AHEAD TODAY

BBC-ACORN KEYBOARDS CASSETTES ADD-ONS BOOKS VIC20

NEW!—BUFFER CLUB for regular customers. Special Offers—Lectures—Foreign Trips—Software Promotions. Ask for details of membership on your next visit.

MEMBER OF THE COMPUTER TRADE ASSOCIATION—YOUR FAIR DEAL GUARANTEE

VISA—ACCESS—AMERICAN EXPRESS—DINERS CLUB
ALL CARDS WELCOME

SOUND with SINCLAIR

MAKE AMAZING SOUND EFFECTS WITH YOUR ZX 81, TIMEX Sinclair 1000 or SPECTRUM



THE ZON X
£25.95
incl p&p & VAT

- The ZON X SOUND UNIT is completely self-contained and especially designed for use with the ZX81, TIMEX Sinclair 1000 and Spectrum Computers. It just plugs in — no dismantling or soldering.
- No power pack, batteries, leads or other extras.*
- Manual Volume Control on panel — ample volume from built-in loud-speaker.
- Standard Sinclair — 16K Rampack or printer can be plugged into ZON X Sound Unit without affecting normal computer operation.
- Huge range of possible sounds for Games, Music, Helicopters, Sci-Fi, Space Invaders, Explosions, Gun-shots, Drums, Planes, Lasers, Organs, Bells, Tunes, Chords, etc., or whatever you devise!
- 8 full octaves. Uses 3 Channel sound chip giving programme control of pitch, volume of tones and noise, all with envelope control.
- Easily added to existing games or programmes using a few simple "BASIC" lines or machine code.
- No memory addresses used — I.O. mapped.

FULL instructions with many examples of how to obtain effects and the programmes, supplied. Fully guaranteed. British Made.

**Except with Spectrum you need the Spectrum Extension Board Order No. SE1 — Price £6.80 incl. V.A.T.*

Payment may be made by Cheque, PO Giro No. 388 7006, Postal Order or Credit Card.
Export orders: — Bank Cheque, International Money Order, U.S. $ or £ Sterling

BI-PAK Dept SU9 PO Box 6, 63A High Street, Ware, Herts

Access & VISA accepted. Ring 0920 3182 for immediate despatch.

NEW: Speech & Music for ZX81 & Spectrum!

ZXM SOUND BOX — £29.95

ZXS SPEECH SYNTHESISER — only £24.99



- 3 channel sound chip gives a huge range of possible sound effects. Programmable pitch, level, envelope and noise source.
- For the ZX81 or Spectrum - no adaptor needed.
- Just plug it in. Other peripherals or Ram Pack can be plugged into the ZXM.
- Built in amplifier and loudspeaker.
- Audio in/out socket, can be used to amplify the Spectrum 'beep'.
- 9-pin I/O socket can be used with cheap Atari/Commodore type joysticks.
- Comprehensive manual includes many example routines.

- For the ZX81 or Spectrum - no adaptor needed.
- Let your computer talk back!
- 'Allophone' synthesis gives an unlimited vocabulary.
- Active filtering for improved speech quality.
- Other peripherals or RAM Pack can be plugged into the ZXS.
- Output to normal audio amplifier or to our ZXM Sound Box.
- Manual gives full details on how to use the ZXS, with many examples.

And Don't Forget Our Books;
EXPLORING SPECTRUM BASIC: £4.95 The book of answers. Explains Spectrum BASIC programming techniques in more depth than was possible in the Sinclair manual, illustrated by over 50 full programs. 192 pages.
THE EXPLORERS GUIDE TO THE ZX81: £4.95 The book for the ZX81 enthusiast. Games, application and utility programs plus much useful information on machine code and hardware. "Immediate and lasting value" (PCW).

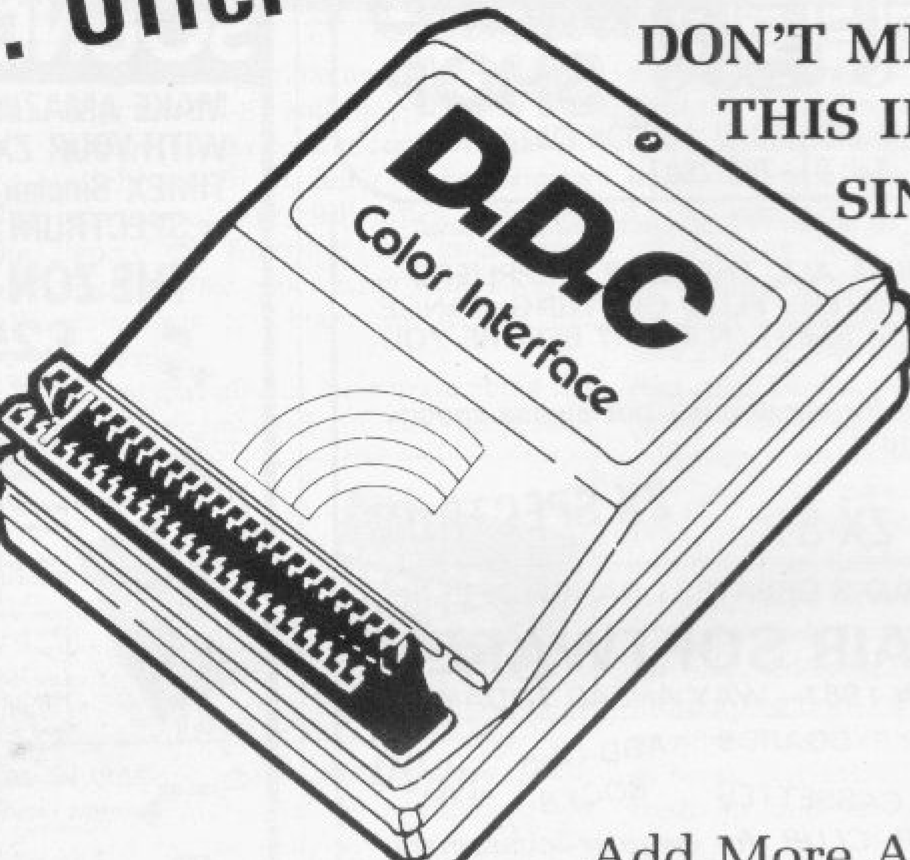
All prices include U.K. carriage and VAT where applicable. Overseas customers add £1.50 per item for surface mail.

TIMEDATA Ltd. 16 Hemmells, Laindon, Basildon, Essex. SS15 6ED Tel.: (0268) 418121

TIMEDATA

Exclusive S.U. Offer—£10 off.

DON'T MISS THIS INCREDIBLE SINCLAIR USER OFFER



For use with ZX-81/ZX-80

1K RAM is enough to obtain 8 colours.

Easy to connect Direct Basic INPUT TEXT and colours simultaneously. Plug directly in your Sinclair connector.

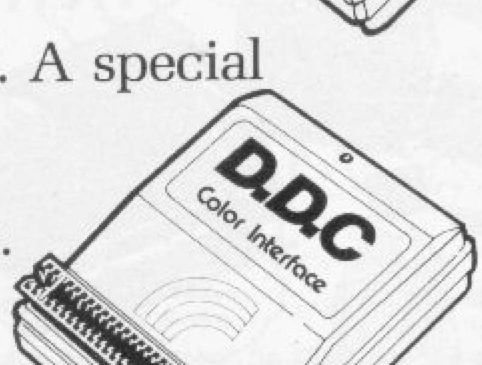


Add More Appeal to your **ZX-81** (and ZX-80) thanks to the DDC Colour Interface*

Compatible with all the memories.

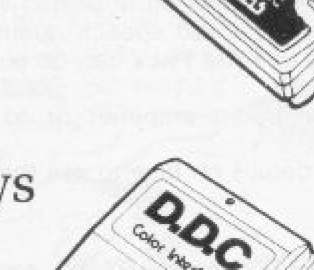
Save £10 on a DDC colour interface. A special offer open only to readers of Sinclair User.

And at a realistic price of only £29.95 (+£2.95 p&p) usually £39.95



*Compatible with many Quicksilva and Artic software.

Limited stocks, so place your order soon. Allow 28 days for delivery.



To: Sinclair User Special Offer,
ECC Publications, 196/200 Balls Pond Road, London, N1 4AQ

Please send me ________ DDC Col. J at the special *Sinclair User* price of £29.95 plus £2.95 p&p.

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to ECC/SU for £ ________

*Please charge to Access/Barclaycard/Trustcard account no. ________

*Please delete/complete as applicable

Signature ________

Name Mr/Mrs/Miss ________

Address ________

The prices apply to United Kingdom only. Overseas orders can be accepted but there will be an extra postal charge. The full price can be obtained on application to ECC Publications at the address on the coupon.

sinclair special

3





Inside...
The New ZX Microdrive!
Latest software...
Latest prices...

The ZX Microdrive- and more!

For some time now, the new ZX Microdrive has been the subject of much discussion. Which is only to be expected, when the object of everyone's anticipation is *completely* new to the world of computing.

Microdrive provides high-speed access to truly massive storage. With just one Microdrive, you'll have at least 85K bytes of storage, and the ability to LOAD and SAVE in mere seconds. Yet the ZX Microdrive is about the size of a Spectrum mains adaptor, and costs less than £50!

First stocks are now in. Microdrives will be released on an order of priority basis. Spectrum owners who purchased by mail order, direct from us, will be sent full details including how to order, in a series of mailings that begins with the earliest names on our list.

And if you didn't buy by mail order?

Don't worry – for a colour brochure with full information on Microdrives, including how to order, just send us your name and address (use the coupon at the back of this issue of Sinclair Special). But remember, the sooner you send us your name, the sooner you'll get on the list.

Of course, there's much more to Sinclair than Microdrives, as you'll see on these pages. The latest releases of Spectrum and ZX81 software have been amongst the most successful ever. Prices of most established Sinclair products are at their lowest ever. To buy what you want, just use the Order Form.

Until the next issue of Sinclair Special, and more good news ...

Nigel Searle, Managing Director, Sinclair Research Ltd.

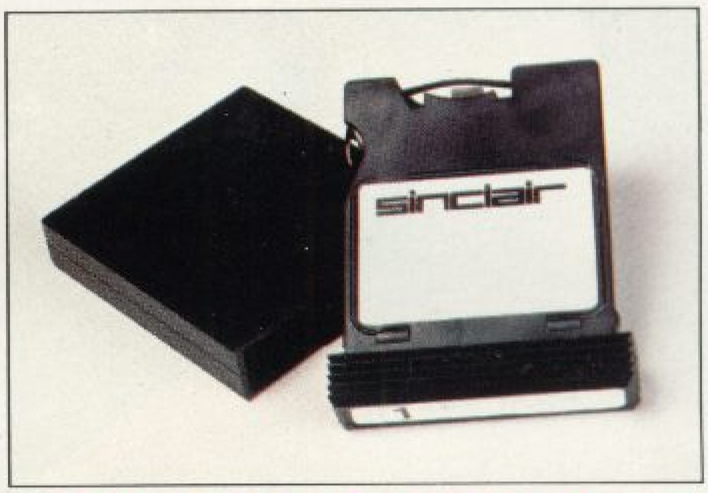
PS: Come and see us – and all that's new at Sinclair – at the PCW Show, Barbican Centre, from Sept 28th to Oct. 2nd. We'll be pleased to see you!

ZX Microdrive System preview!



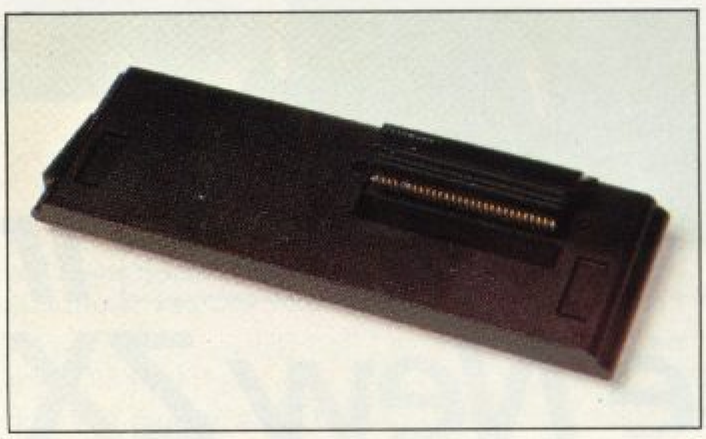
ZX MICRODRIVE

At least 85K bytes storage, loads a typical 48K program in as little as 9 seconds: £49.95.



ZX MICRODRIVE CARTRIDGE

Compact, erasable, revolutionary. Complete with its own storage sleeve. Contains up to 50 files, with a typical access time of 3.5 seconds: £4.95.



ZX INTERFACE 1

Necessary for sending and receiving data from ZX Microdrive. Includes RS232 interface, enables creation of local area network of 2 to 64 Spectrums. Attaches to the underside of your Spectrum. Purchased with ZX Microdrive, just £29.95. As separate item, £49.95.



Six new ways to make more of your Spectrum

Take a look at these brand-new titles. Each is an outstanding new program using the full potential of the Spectrum, for games with stunningly animated graphics, for strategies of fiendish cunning, for masterly applications of computing capability…

Cyrus-IS-Chess Based on the Cyrus Program, which won the 2nd European Microcomputer Chess Championship *and* trounced the previously unbeaten Cray Blitz machine. With 8 playing levels, cursor piece-movement, replay and 'take-back' facilities, plus two-player option. The 48K version has many additional features including an extensive library of chess openings. For 16K or 48K RAM Spectrum.

Horace and the Spiders Make your way with Horace to the House of Spiders, armed only with a limited supply of anti-spider-bite serum. In the house, destroy the webs before the spiders can repair them. Then destroy the spiders, before *they* destroy Horace! Undoubtedly the creepiest Horace program ever produced! For 16K or 48K RAM Spectrum.

Computer Scrabble The famous board game, on-screen – with the whole board on view! A huge vocabulary of over 11,000 words. Full-size letter tiles, four skill levels – the highest of which is virtually unbeatable. For 1 to 4 players. For 48K RAM Spectrum.
(SCRABBLE trademark and copyright licensed by Scrabble Schutzrechte und Handels GmbH – a J.W. Spear and Sons PLC subsidiary.)

Backgammon A fast, exciting program, with traditional board display, rolling dice and doubling cube. Four skill levels. For experts – or beginners. (Rules are included – it's the quickest way to learn the game.) For 16K or 48K RAM Spectrum.

FORTH Learn a new programming language, as simple as BASIC, but with the speed of machine code. Complete with Editor and User manual. For 48K RAM Spectrum.

Small Business Accounts Speeds and simplifies accounting work, produces Balance Sheets, Profit and Loss information *and* VAT returns. Complete with User manual. For 48K RAM Spectrum.

Overleaf – your Sinclair order form.

Latest ZX81 software



These three new cassettes offer two totally different challenges to you and your ZX81. The games – like so many ZX81 games today – really do use the ZX81's capability. The FORTH program is a fascinating extension of your own computer understanding.

Sabotage. Defender or attacker? The choice is yours in this exciting game.
Be the guard and defend the ammunition in the compound – or be the Saboteur and attack it!
Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

City Patrol. You are the Commander of a laser-firing ship. Your task is to intercept and destroy alien suicide ships descending on your city.
Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

FORTH. Discover a new programming language which combines the simplicity of BASIC with the speed of machine code. FORTH's compiled code occupies less than a quarter of the equivalent BASIC program and runs ten times as fast. Free User-Manual and Editor Manual with each cassette.
Written by Artic for a ZX81 with 16K RAM. Cassette price: £14.95.

Prices round-up

ZX Spectrum 48K
now just **£129.95.**

ZX Spectrum 16K
now just **£99.95.**

ZX81 now just **£39.95.**

16K RAM Pack for ZX81
£29.95.

ZX Printer now just **£39.95.**

1.2A ZX Mains Adaptor
£7.95.

Printer Paper (5 rolls)
£11.95.

How to order

Simply fill in the relevant section(s) on the order-form below. Note that there is no postage or packing payable on Section B. Please allow 28 days for delivery. Orders may be sent FREEPOST (no stamp required). Credit-card holders may order by phone, calling 01-200 0200, 24 hours a day. 14-day money-back option.

sinclair

Sinclair Research Ltd,
Stanhope Road, Camberley,
Surrey GU15 3 PS.
Telephone: (0276) 685311.

To: Sinclair Research Ltd, FREEPOST, Camberley, Surrey, GU15 3BR.

ORDER FORM

Section A: hardware purchase

Qty	Item	Code	Item Price £	Total £
	ZX Spectrum – 48K	3000	129.95	
	ZX Spectrum – 16K	3002	99.95	
	ZX 81 (including 1.2A Mains Adaptor)	1003	39.95	
	16K RAM pack for ZX81	1010	29.95	
	ZX Printer	1014	39.95	
	1.2A Mains Adaptor, for use with ZX81 computer/ZX Printer combination (only required if you have an early ZX81 with 0.7A Adaptor)	1002	7.95	
	Printer paper (pack of 5 rolls)	1008	11.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			TOTAL £	

Section B: software purchase

Qty	Cassette	Code	Item Price £	Total £
	FOR SPECTRUM			
	G22/S:Backgammon	4021	5.95	
	G23/S:Cyrus-IS-Chess	4023	9.95	
	G24/S:Horace & the Spiders	4022	5.95	
	G25/S:Scrabble	4024	15.95	
	L1 /S:FORTH	4400	14.95	
	B6 /S:Small Business Accounts	4605	12.95	
	FOR ZX81			
	G25: Sabotage	2124	4.95	
	G24: City Patrol	2123	4.95	
	L1: FORTH	2400	14.95	
			TOTAL £	

*Delete/complete as applicable.

*Please charge to my Access/Barclaycard/Trustcard account no:

*I enclose a cheque/postal order made payable to Sinclair Research Ltd for £

Signature

Mr/Mrs/Miss

Address

SUS 909
(Please print)

ZX Microdrive information request

Please send me a colour brochure with full specifications of ZX Microdrive/Interface 1, *and* add my name to the Microdrive Mailing List! *(tick here)* ☐ (Remember to include your name and address on the form above).

Adults get good guide to mysteries of the micro

Many parents do not understand children's interest in computers. John Gilbert reviews a publication aimed at helping them

THE SPECTRUM and ZX-81 until now have been children's playthings so far as many parents are concerned. With the availability of a new book which aims to provide an introduction to computers for parents, that situation may change.

The book is *Kids and Computers, The Parents' Microcomputer Handbook,* by Eugene Galanter. It first takes an adult through the history of computing to explain why computers are so important and what effect they have in our lives.

The opening chapters state that if children are not computer literate to some degree they are illiterate as far as education in Britain is concerned. That is true to some extent and the author argues the case strongly in the chapters which follow.

He stresses the good points of using a computer. Using a keyboard will prepare a child for typing skills which may be required in later life. They will learn that the computer does not tolerate spelling mistakes in programs, so the child will have to spell correctly. The child must also solve problems in small, logical steps.

The book shows how the parent can become involved in the learning process without taking away the feeling of achievement from the child. There is even a computer development chart showing the average ages at which children assimilate computer skills. The learning process can start at about five years of age when the child becomes used to the keyboard and is able to locate characters on it.

It is an excellent introduction for parents who want to know why their children spend all their spare time in the bedroom in front of a computer keyboard and screen. It is available from Kingfisher Books and is an inexpensive hardback costing £5.95.

Fun Mathematics on your Microcomputer continues the educational theme. It is by Czes Kosniǒwski and aims to show that mathematics can be entertaining.

Some of the explanations are a little difficult to understand and the general style of the book would make it of more interest to college or university students than to schoolchildren or adults with only a rudimentary understanding of mathematics. That is a pity as many of the ideas of the author are of interest to anyone who owns a computer.

The most interesting chapters cover games playing and graphics. If you are interested in gaming strategy or how to draw three-dimensional shapes, the book is for you.

Kosniǒwski shows that almost every operation performed by a computer is in some way governed by numbers and that it is with equations and formulae that games and graphics are designed. The book, from Cambridge University Press, costs £4.95.

The Complete Programmer, by Mike James, is another book which professes to show the beginner the difference between good and bad programming practice. It is different from most of the others which seem to be written by people who know a good deal about theory but not so much about practice.

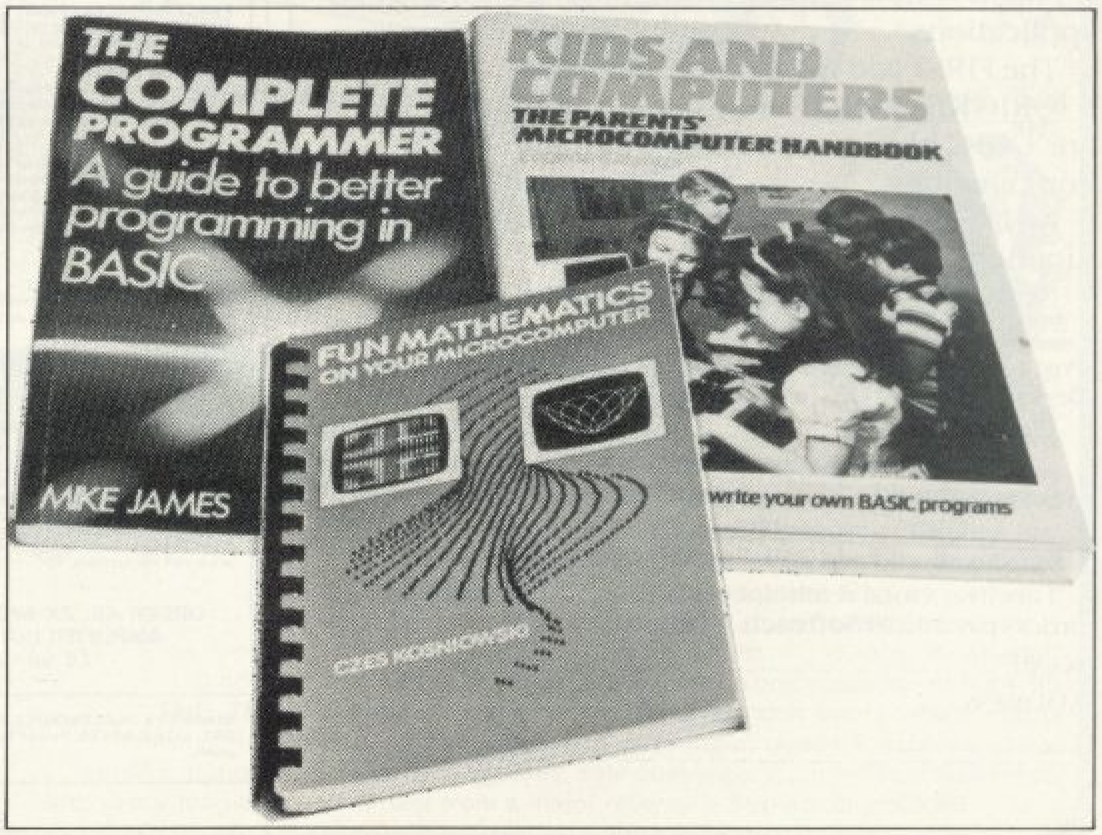
James makes no claim about being an expert in programming techniques, although he obviously is, and even stresses that there is no such thing as good programming technique, only preferred.

If a reader can tolerate the dense style of the author the text is guaranteed to increase knowledge of programming and therefore make programs easier and more fun to write. On top of that your programs will run faster than they used to do and the listings will be easier to understand.

The *Complete Programmer* is one book on 'better' programming technique which can be thoroughly recommended. James' style is slightly heavy-going and some of his arguments could be compressed from a page to a paragraph but the book is worth having as a reference or learning manual.

It costs £5.95 and can be obtained from Granada Publishing. It is slightly expensive but the information it contains is worth the extra money.

Kingfisher Books Ltd, Elsley Court, 20–22 Great Titchfield Street, London W1P 7AD.
Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU.
Granada Publishing, PO Box 9, Frogmore, St. Albans, Hertfordshire AL2 2NF.



Put everything you need on the keyboard with a Custom Keypanel Kit.



Everything you need
IS on the keyboard with
CUSTOM KEYPANELS.

These precision die-cut plastic panels fit perfectly over your keyboard and provide an instant and individual reference to all of your software.

Each Kit comes in a clear plastic storage wallet and contains: 10 Matt-black Keypanels plus sheets containing over 140 self adhesive Command labels pre-printed with words, symbols and arrows, plus a sheet of blanks for your own designs.

SPECTRUM KEYPANELS are 96x224mm and the labels are printed in 'Spectrum' bright red. A MUST for flight-simulation and all multi-key games and applications.

The FIRST add-on for your Spectrum.

ORIC KEYPANELS are 105x275mm and the labels are 'ORIC' blue. Master those CTRL and ESC key combinations.

An INSTANT reference to all ORIC's keyboard functions.

NOW IN 'SUPER ML' PLASTIC!

Post today to **Softeach Limited**, 25 College Road, Reading, Berkshire, RG6 1QE. We despatch to you first class post by return.

Please send me:

.... Spectrum Keypanel Kits at £3.95 + 35p p&p each (overseas should add 25% for additional surface mail)

.... ORIC Keypanel Kits at £4.95 + 35p p&p each (overseas should add 25% for additional surface mail)

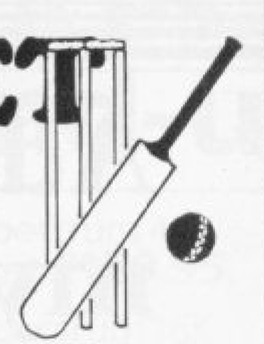
I enclose a total remittance of £ .... cheques/postal orders payable to **Softeach Limited**.

NAME ....

ADDRESS ....

.... SU S

CRICKET



FOR

ZX SPECTRUM 48K

By David Owen

Look at these features:

★ ***EXCITING MATCHES*** in which your decisions really count. Make bowling changes and field positionings; tell your batsmen to score faster or to be more defensive.

★ ***INTELLIGENT PROGRAM:*** The Spectrum decides your opposition's strategy skilfully and logically.

★ ***DETAILED PLAYER CHARACTERISTICS:*** Get to know your team's strengths and weaknesses.

★ ***INFINITE OPPOSITION:*** Including all the County sides. Ten difficulty levels.

★ ***BALL BY BALL COMMENTARY*** — scoreboard, scorecard and many interesting and helpful features.

★ ***USES 48K to the full!***

A realistic, addictive and enjoyable game

£6.95 including post and packing and full instruction booklet. Export orders add £1.00

T. J. OWEN, NORLINGTON, LEWES ROAD, EAST GRINSTEAD, W. SUSSEX RH19 3TA

Trade enquiries welcome.

HEART RATE MONITOR

FOR ZX-81 and SPECTRUM

SAFE — RELIABLE — EASY
USE YOUR COMPUTER FOR HEALTH AND FITNESS

Convenient to use. Continuously monitors your pulse and displays digital heart rate on the screen. Plug in heart rate monitor suits Spectrum and ZX-81. Detects your pulse from finger or thumb placed over the sensor unit. The sensor unit is linked to the heart rate interface by 3 metres of cable. Includes an extender card — allowing use of printer, RAM pack etc. Takes power from the computer — avoids the use of batteries.

PRACTICE RELAXATION
Concentrate on reducing the displayed pulse rate. Your progress can be recorded and displayed as a 'rate of fall' which you can use as a personal performance record.

MONITOR FITNESS
Check your heart rate before and after a set exercise. Monitor how quickly it returns to normal. Your fitness level can be assessed by this method and used as a yardstick for future comparisons. Whatever form of exercise you take its effect on the pulse rate can be a significant indicator of fitness.

Simple basic programs can be used to produce graphs of heart rate versus time. Linked to your ZX-81 or Spectrum computer the signal can be used in your own simple basic programs to give continuous heart rate displays, bar charts, graphs etc. Compatible with all levels of program from simple basic routines upwards. Spectrum users can incorporate beep commands to give 'ECG' type sounds.
Does not interfere with the use of a printer — so you can down load your performance curves for comparison.

SUPPLIED READY BUILT — includes plug in Heart Rate Monitor interface with extender card, sensor unit and linking cable, software and instructions, READY TO USE £29.98. ORDER AS: HEART RATE MONITOR (HRM SU). STATE ZX-81 or SPECTRUM. £29.98.

ZX SPECTRUM AMPLIFIER

250mW output. Volume control. Internal speaker. Very simply connected using load/save lead. Puts real power even into the simplest "Beep" commands. Adds a real "zing" to musical programs and games. Requires PP3 battery — not supplied. Very low current drain. Supplied ready built complete with demo software and instructions.

ORDER AS: ZX SPECTRUM AMPLIFIER (SA SU) £6.98

ZX SPECTRUM SUPER AMPLIFIER

250mW output. Now add synthesizer quality to those "Beep" commands. Super circuit with adjustable ATTACK, SUSTAIN and DECAY envelope controls. Plus variable ECHO. Generates a wide range of special effects. Five graduated controls. Internal speakers. Very smart case. Requires batteries — not supplied. Very low current drain.
Ready built complete with demo software and instructions.

ORDER AS: ZX SPECTRUM SUPER AMPLIFIER (SAA SU) £17.98

MAGENTA ELECTRONICS LTD, Dept SU1. 135 Hunter Street, Burton-on-Trent, Staffs DE14 2ST. (0283) 65435. Prices include VAT, add 50p p&p. Cash with order. Access/Visa by phone or post.

Can you prevent the program being listed?

Andrew Hewson considers security and zero line numbers

EACH MONTH I re-read the latest batch of letters and note the contents. Then I decide which to answer in the magazine, trying to mix easy topics for beginners with something more substantial for the more advanced.

Despite summer weather there have been sufficient dedicated Sinclair users, red-eyed and finger-sore, scribbling feverish notes about desperately important problems to provide the usual mixture of easy, interesting, exacting, impossible and incomprehensible letters.

The first is from Chris Porton of Pinner, Middlesex. He writes: **Some games listings contain an O REM statement when listed. How do you obtain such a line number and can you prevent the rest of the program being listed, too?**

To answer the question I must first explain a little about how a program is held in the ZX-81 or Spectrum. To avoid confusion I shall explain the situation for the ZX-81 in detail and then outline the differences for the Spectrum.

The first diagram on page 171 of ZX-81 Basic Programming shows that the Basic program area starts at address number 16509. The following simple ZX-81 program PRINTs the contents of the first 20 locations in the Basic program area on the screen, i.e., it looks at the 20 locations starting at 16509:

```
10 FOR I=16509 TO 16528
20 PRINT I;TAB 8; PEEK I;TAB
   16;CHR$ PEEK I
30 NEXT I
```

If the computer memory is cleared before the program is entered, either by disconnecting the power supply temporarily or by entering NEW, the program area will contain the three program lines only. Thus when the program is RUN it will be looking at itself. The screen display will show, for example, that locations 16513 to 16520 contain the code for the command 'FOR' (235) followed by the codes for each of the seven characters I, =, 1, 6, 5, 0 and 9.

The first two bytes, 16509 and



• *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.*

16510, contain 0 and 10 respectively because those two bytes are used to specify the line number of the first line, the calculation being:

256 * first byte+second byte=line number.

Experiment by POKEing new numbers into those two locations and then LISTing the program to see the effect. Try, for example:

```
POKE 16509,10
POKE 16510,27
LIST
```

It will be seen that the line number of the first line is then 2587 because

256 * 10+27=2587.

Notice that the order of the lines has not been changed and therefore it can be concluded that the ZX-81 has taken no action as a result of the interference with the contents of the program area. The program no longer works because the NEXT command in line 30 directs the ZX-81 to continue execution from the line following line 10. As line 10 no longer exists the program fails. Hence unless care is taken to avoid the use of FOR-NEXT loops and GOTO and GOSUB commands it is not possible to run a program with line numbers corrupted in that way. There are two tricks worth mentioning. Try entering:

```
POKE 16509,39
POKE 16510,10
LIST
```

The first line number will then be 9994 because 39 * 256+10=9994.

continued on page 124

Hex code	Assembler code	Comment
01 0A 00	LD BC,10	New first line number
2A 53 5C	LD HL, (PROG)	Beginning of program area
70	LD (HL),B	Insert new line
23	INC HL	number
71	LD (HL),C	
23	INC HL	
5E	LD E,(HL)	Load line length
23	INC HL	into DE
56	LD D,(HL)	
23	INC HL	
19	ADD HL,DE	Address of next line
E5	PUSH HL	Save address
ED 5B 4B 5C	LD DE,(VARS)	Address of end of program
A7	AND A	Clear carry flag
ED 52	SBC HL,DE	End?
30 09	JR NC,9	Jump if yes
21 0A 00	LD HL,10	No, step size is 10
09	ADD HL,BC	Increment line number
44	LD B,H	and store in BC
4D	LD C,L	
E1	POP HL	Retrieve address
18 E4	JR −28	Jump to continue
E1	POP HL	End
C9	RET	

Table 1. A program to re-number Basic programs on the Spectrum, excluding GOTOs and GOSUBs.

continued from page 123

The largest line number allowed on Sinclair machines is 9999 so, it may be asked, what happens when an attempt is made to insert a bigger line number? To determine enter:

```
POKE 16509,40
LIST
```

The first line number is then shown as A250 whereas we would have expected it to be

40 * 256 + 10 = 10250.

Reference to the table of codes of the character set in appendix A of ZX-81 Basic Programming gives a clue to the situation. The table shows that the codes for the digits 0 to 9 are 28 to 37 respectively and they are followed by the codes for the letters of the alphabet. The ZX-81 is programmed to expect line numbers to contain at most four digits. When it finds a line number which should have five digits it uses a single letter from the beginning of the alphabet to represent the first two—A to represent 10, B to represent 11, C to represent 12.

Provided the line numbers are kept in order, programs can be written to use line numbers up to 16383—which appears as G383. Fortunately the machine will accept incorrect instructions like

```
GOTO 12530
```

which makes writing such programs easier than it would otherwise be.

Attempting to POKE in line numbers greater than 16383 causes the program display to disappear and so this is the answer to Porton's second question. To see this effect enter

```
POKE 16509,99
```

The program no longer functions although it is still present in memory as can be seen by entering

```
POKE 16509,0
```

The Spectrum is very similar to the ZX-81 in those features. The principal difference is that the program area does not start at a fixed location. The address is held in the PROG system variable which can be read by entering

```
PRINT PEEK 23635+256 * PEEK 23636
```

The result is normally 23655.

The Spectrum character codes are also different from those of the ZX-81, as can be seen by studying appendix A of ZX Spectrum Basic Programming.

Phil Jones of Carshalton writes: **Is there a simple machine code line re-number program which also re-numbers GOTOs for the Spectrum? I have seen two in magazines but they are too complicated for me to understand.**

The short answer is no, but I can help by explaining the various tasks which must be executed by the routine. Enter and RUN the following program which looks at the Spectrum program area:

```
10 FOR I=23755 TO 23800
15 PRINT I;TAB 8;PEEK I; TAB
   16;CHR$ PEEK I
20 NEXT I
```



Locations 23755 and 23756 contain 0 and 10, thus specifying the line number of the first line. Locations 23759 to 23766 inclusive contain the codes FOR,I,=,2,3,7,5 and 5 but in between there are locations 23757 and 23758. They contain 27 and 0 and in doing so they specify the length of the remainder of the line. The calculation is

first byte + 256 * second byte = line length
i.e., 27 + 256 * 0 = 27.

Hence the line ends at location 23758 + 27 = 23785 as can be seen by allowing the Spectrum display to scroll on and noting that location 23785 contains the ENTER character code (13) and is followed by two bytes containing 0 and 15 forming the line number of the second line.

Armed with that information it is reasonably easy to write a program to re-number only the line numbers of a Basic program. An example is shown in table one. To load the program enter and RUN the Basic hex loader listed in table two and then enter each pair of hex codes given in table one in turn. On completion, enter S to stop the Basic program.

The re-number program can be executed by entering

```
RAND USR 23296
```

If the program has been loaded correctly the Basic program will be re-numbered using a stepsize of 10, not five as shown in the original listing.

A program to re-number GOTO and GOSUB commands as well as program lines would need to execute the following steps:

Reserve some space in memory as a working area.

Identify each GOTO and GOSUB in the program and store its address and destination label in the working area.

Re-number each line in turn, checking the old line number against the destination labels in the working area.

Whenever a match is found, convert the new number to character form and over-write the character form of the destination label.

If the new and old labels differ in character length, extend or contract the entire program area to accommodate the difference. For example, if the old label were 95 and the new one 140 the program area would have to be made one byte longer. Update the addresses held in the working area appropriately.

Convert the new line number to floating point form and over-write the numerical form of the destination label held in the program area.

Delete the entry in the working space so that labels are not re-numbered erroneously more than once.

Clearly the code to undertake those tasks must be sophisticated. Some ROM routines can be used—to convert numbers from character to numeric form, for example—but a suitable routine is nonetheless likely to be 400 to 500 bytes long.

```
5 FOR I=23296 TO 23551

10 INPUT Z$

15 IF Z$="S" THEN STOP

20 PRINT Z$;" ";

25 LET Z$(1)=CHR$ (CODE
   Z$(1)-7*(CODE Z$(1)>57))

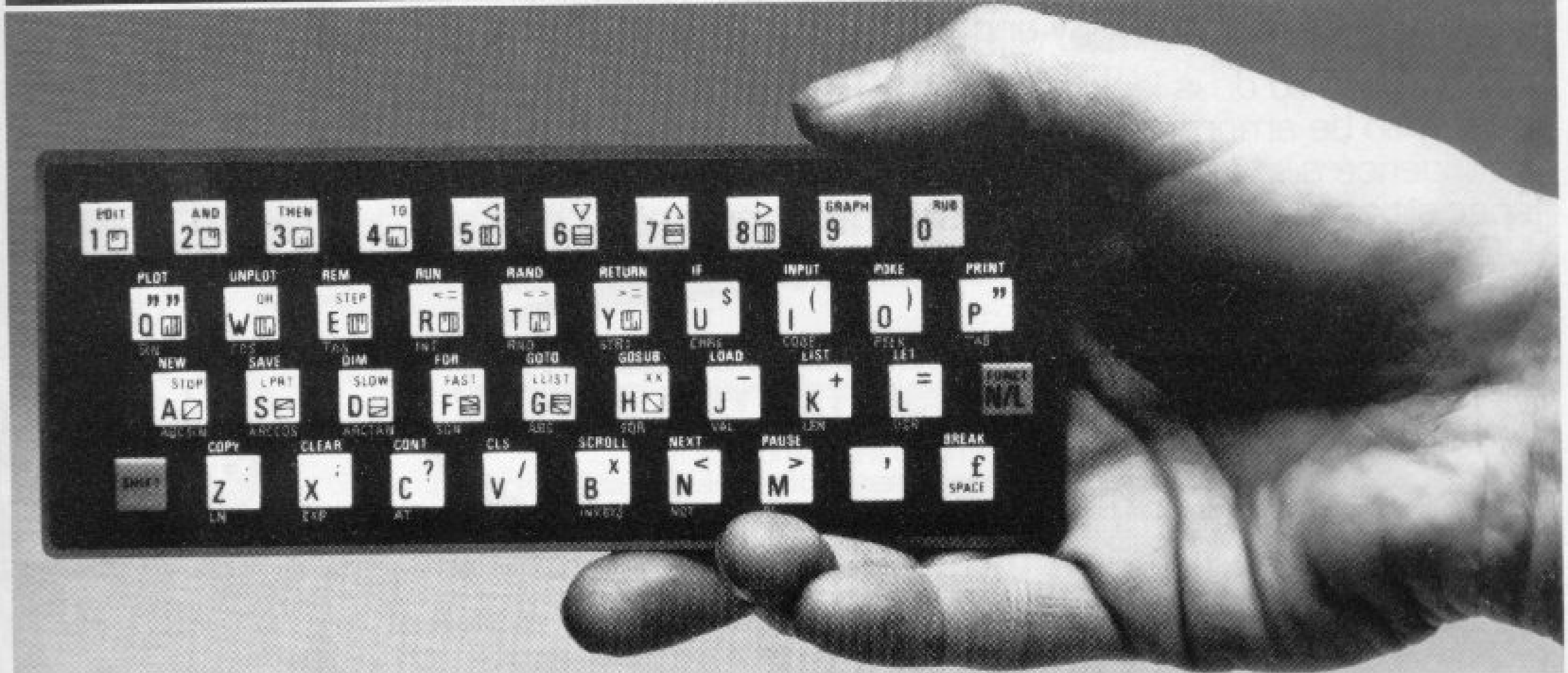
30 LET Z$(2)=CHR$ (CODE
   Z$(2)-7*(CODE Z$(2)>57))

35 POKE I,16*CODE Z$(1)+CODE
   Z$(2)-816

40 NEXT I
```

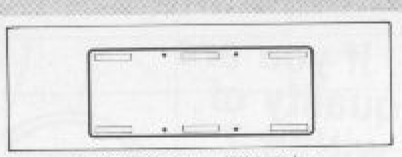
Table 2. Spectrum program to load pairs of hexadecimal codes into the printer buffer.

NOW. A ZX81 PUSH-BUTTON KEYBOARD FOR UNDER £10.

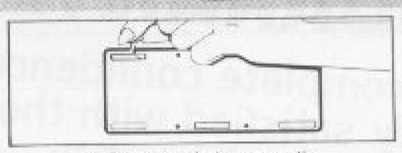




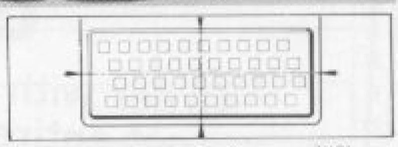
1. Make sure the original keyboard is clean and check that all the keys function.



2. The Buttonset is held in place by self adhesive pads.



3. So all you do is remove the protective backing.



4. And place it centrally on your ZX81.

At last there's a really cheap but efficient way of ironing out the ZX81's only real bug: its keyboard. The Filesixty Buttonset offers:

■ A full-travel calculator-type moving keyboard for only £9.95. ■ Installed in seconds. The peel-off adhesive backing means you just register into position and press. ■ No messy labels, dismantling or soldering. ■ 3 groups of colour keys to pick out shift, numerals and newline. ■ Precision moulded in ABS to match your ZX81, with contrasting legends for maximum legibility.

Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England.
Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.

Orders to Filesixty Ltd., FREEPOST, London W9 2BR.

Cheques/PO made payable to Filesixty Ltd.

Please send me ________ (qty) Buttonset(s) at £9.95 each (including VAT and P&P).

Total £ ________ BLOCK CAPITALS

Name ________

Address ________

SU10

FILESIXTY

Play in the big league — with only the best, newest programs!

We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games — and business programs — many of which cannot be bought by mail order from any other source!

Every month, we'll be adding to our catalogue to bring you the best of new games, new business, educational and household software. And the good news is — **we're specialising in programs for your Sinclair!**

With our special new deal — you just CAN'T GO WRONG.

* A free offer every month [this time it's a free blank C20 cassette with every two games ordered]
* A money-back guarantee if you're not entirely satisfied with your purchase — that's how confident we are about the quality and value!

All you have to do is look at our first HOT selection, then order quickly to be among the first to own these games of skill, intelligence and excitement [fast delivery is another of our specialities — so you could be using these new programs SOON].

FREE BLANK C20 COMPUTER CASSETTE WITH EVERY TWO CASSETTES YOU ORDER!

Remember there's no limit to the number of free cassettes you receive if your order justifies them — so why not get together with friends or user group members and share the freebies?

GUARANTEE

Order with complete confidence. If you are not entirely satisfied with the quality of your purchase return it to us within 7 days and we will provide a replacement.



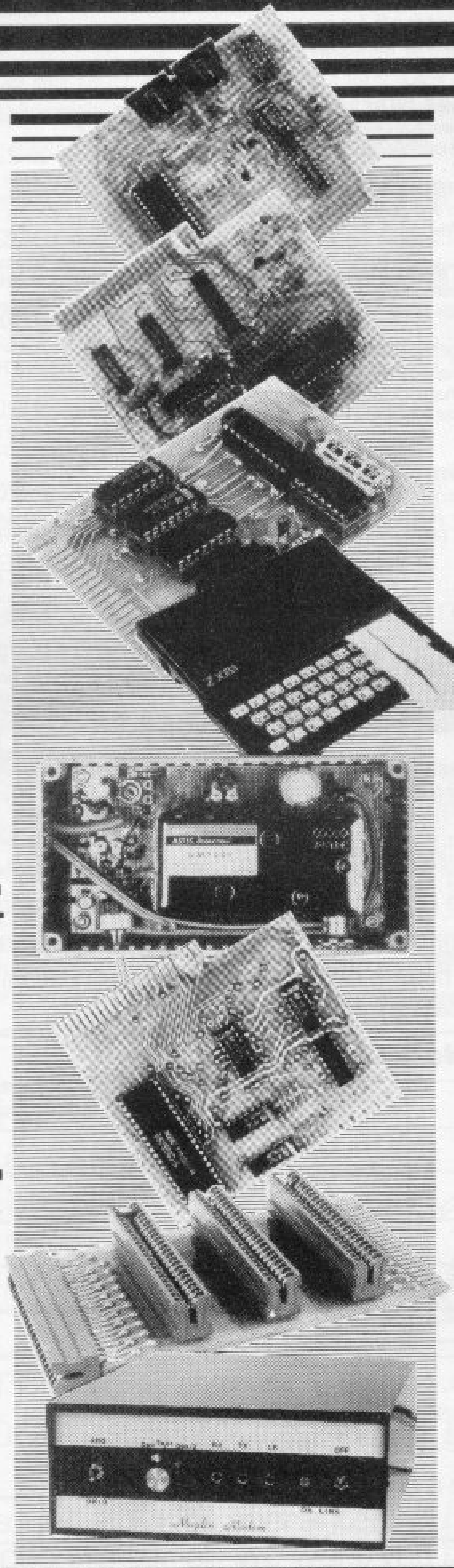
GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction [after all, we want you to come back for more!]

The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP



EXCITING ADDITIONS FOR YOUR HOME COMPUTER





THE MAPLIN TALK-BACK for ZX81 and VIC20

Now your computer can talk

- ★Allophone (extended phoneme) system gives unlimited vocabulary.
- ★Can be used with unexpanded VIC20 or ZX81 — does not require large areas of memory.
- ★In VIC20 version, speech output is direct to TV speaker with no additional amplification needed.
- ★Allows speech to be easily included in programs.

Complete kits. Order As:
LK00A (VIC20 Talk-Back). Price £24.95.
LK01B (ZX81 Talk-Back). Price £19.95.
Full construction details in Maplin Projects Book 6. Price 70p. Order As XA06G.

SOUNDS GENERATOR FOR ZX81

3-Programmable tone generators with programmable attenuators turns your ZX81 into a mini-synthesiser.
Noise generator with 3 pitch levels enables the creation of most special effect sounds.
Single address access via BASIC with PEEK and POKE. Connects directly to expansion port socket or motherboard.
Complete kit. Order As LW96E. Price £10.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.

ZX81 INPUT/OUTPUT PORT

Two bi-directional ports for a total of 16 input or 16 output lines.
Includes one buffered output which can interface directly to CMOS.
On board address selection allows for expansion to 6 ports with two boards.
Complete kit. Order As LW76H. Price £9.25.
Full construction details in Maplin Projects Book 4. Order As XA04E. Price 70p.

MODEM

A CCITT standard modem that connects directly to your telephone line via a B.T. approved transformer. Transmits and receives simultaneously on European standard frequencies at 300 baud. May be used to talk to any other 300 baud European standard modem including the Maplin Computer Shopping modem on 0702 552941 and any British Telecom Datel 200/300 Service modem. The modem's computer interface is RS232 compatible.
A complete kit excluding case is available. Order As LW99H. Price £39.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.

KEYBOARD with ELECTRONICS for ZX81

- ★ Full size, full travel keyboard that's simple to add to your ZX81 (no soldering in ZX81).
- ★ Complete with electronics to make "Shift Lock", "Function" and "Graphics 2" single key selections.
- ★ Powered (with adaptor supplied) from ZX81's own standard power supply.

Full details in Project Book 3 (XA03D). Price 70p
Complete kit (excl. case) £21.90.
Order As LW72P.
Case £4.95. Order As XG17T.
Ready built-in case £29.95.
Order As XG22Y.

ZX81 TV SOUND

ZX81 sound on your TV set.
Video reversing switch for normal or inverse video display. Can be used with the Talk-Back or Sounds Generator kits.
Complete kit. Order As LK02C. Price £19.95.
Full construction details in Maplin Projects Book 6. Order As XA06G. Price 70p.

ZX81 EXTENSION BOARD

Our ZX81 Extendiboard plugs directly into the ZX81 expansion port and will accept a 16K RAM pack and three other plug-in modules simultaneously. Parts are sold separately as follows:
PCB Order As GB08J. Price £2.32.
Edge Connectors (4 needed) Order As RK35Q. Price £2.39 each.
Track pins (1 pack needed). Order As FL82D. Price 85p per pack of 50.

INTERFACES for MODEM

Interfaces for most popular home computers which do not have RS232 ports will be available shortly. An interface for the ZX81 that includes a complete Machine Code Communications Program is available. Order As LK08J (ZX81 Modem Interface Kit). Price £24.95.
Full construction details in Maplin Projects Book 7. Order As XA07H. Price 70p.

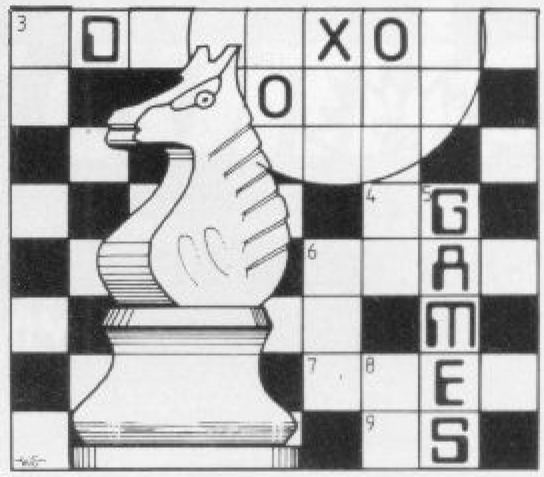
MAPLIN

Maplin Electronic Supplies Ltd., Mail Order: P.O. Box 3, Rayleigh, Essex SS6 8LR.
Tel. Southend (0702) 552911 (Sales).

159-161 King St., Hammersmith, W6. Tel. 01-748 0926. 284, London Road, Westcliff-on-Sea, Essex. Tel. (0702) 554000. Lynton Square, Perry Barr, Birmingham. Tel. (021) 356 7292.
All prices include VAT & carriage. Please add a 50p handling charge to orders under £5 total value.

Quentin Heath goes in search of the evil and mysterious Black Crystal and into the Halls of Things to find magical milk

Graphic action takes adventures into new areas of interest



THE CONCEPT of an animated adventure is reasonably new. Such a package is distinct from an adventure like The Hobbit or Planet of Death, because all the action takes place in graphics form. There is little or no text with this type of adventure.

There are only two graphics adventures which stand out in the market at the moment. The first to be produced was **Black Crystal** from Carnell Software. The company produced a version of the game for both the ZX-81 and Spectrum.

The adventure is loaded in several sections because of its memory requirements. Each section puts the user into a different scenario. For instance, the first part displays an overhead view of a fantasy land in which the game is taking place. In that land you have to find the rings which, when brought together, will destroy the evil black crystal.

To find all the rings the player must go through forests and castles to reach the tower room where the black crystal has its domain.

When I first started to play the game the rings seemed to be scattered randomly around the map. Soon I found that several of the rings could be detected in the forest area of the map every time I went back to the program.

When I had found all the rings on map one I entered the castle in the middle of the map. There are several levels to the castle and on the lowest I found an invisibility charm which helped me to evade the ghouls which plagued me continually.

Another difficulty which you may find on level two of the castle is the mist which can damage your health seriously. The best way to disperse it is by using your power drain.

When moving round the castle it is best to keep your finger on the 'swerve' key. That will use some of your energy but you will avoid some of the nastier aspects of the monsters when they strike at you. To get to each map of the game you have to know the code numbers which have been given to you from the previous map. I have several of them but if any readers have discovered the last two I would be interested to hear.

Black Crystal is a Basic program and as a result the game movement routines are slow. The second graphics adventure to reach the market is **Halls of the Things** and, despite its awful title, it is very fast to play.

It is written in machine code and is the first graphics adventure for which I would recommend a joystick. The action centres on a maze of seven levels. Each level can be reached by moving up a staircase on the right of the maze.

As with Black Crystal, the object of your quest is to find the rings of power but to do that you must kill as many of the Things as you can. To do so you have a bow and arrow, lightning bolts which may rebound on you, and magical firebolts. The monsters are also equipped with those weapons and if you are hit by one of them your strength is sapped.

To regain your magical strength you must drink as much as you can of the milk which is lying around the maze. That part of the game is not stressed in the documentation with the package, as the authors believe that players should find their own ways to survive.

One of the most important tips which I picked up during play was that you should have your finger on the fireball key when you enter a section of the maze from the stairway. When you get into the maze you will not be able to see all the monsters which are approaching you. A fireball will be produced if the monster is in your vicinity, so when you see that flame flare you should beware of the Things.

The fireball is the easiest weapon to use, so at some point in the game you will be tempted to use it all the time. Unfortunately that weapon is also the most costly in terms of magical strength. If you have time you should try to use your bow and arrow.

The bow is the most difficult of the weapons to use as the Things will often surprise you and launch a quick attack even before you have your bow stringed. To fire an arrow you must indicate in which direction you want it to fly and then press the arrow release key. Several shafts can be fired at one time if the need arises.

The mazes which are created in Halls of the Things are set randomly but the game is easier to play in some parts of the maze than in others. The upper levels are the easiest to play in because there are fewer narrow corridors and more open spaces in which to see monsters coming. The expert, however, will find many things to tax the brain in the lower part of the maze.

HINTS AND TIPS

Halls of the Things

When entering you will be amazed,
Just fire a quick blast to start a blaze;
With lower levels you have more chance,
Above those monsters will lead you a dance;
All that glitters is not gold,
The wall's one place to metamorphose.

Black Crystal

Castle stairs,
In wall-like snares;
Where weapons are concerned,
The means to an end are always appropriate.

● *If you have any views on mind games or if you have hints and tips on adventure, computer-moderated games or chess, please write to me:*
Quentin Heath, Mind Games, c/o *Sinclair User*, ECC PUblications, 196-200 Balls Pond Road, London N1 4AQ.

THE TOMB OF DRACULA!



3D HORROR ADVENTURE GAME!

For the **16K ZX81** or with colour and sound for the **48K SPECTRUM,** a superb 3D graphics adventure game! **Enter** Dracula's tomb at 30 minutes to sunset . . . **wander** through the tomb's pre-mapped 300 vaults in search of the fabled Vampire's Treasure . . . **pick up** valuable silver stakes and use them to defend yourself against the lurking horrors . . . ghouls, zombies, pits of primaeval slime . . . **See** them all on the computer's plan of the tomb . . . when it will let you! **Take** a chance on a Mystery Vault . . . if you dare! And all the time the minutes are ticking by to sunset . . . when **Dracula** rises from his coffin and comes after **you!** Each of the infinite levels of the tomb has its own 300 vaults . . . go as deep as you like, the Prince of Darkness will seek you out in his blood-lust! **WARNING: people of an exceptionally nervous disposition should play this game only during the hours of daylight!** Special facility lets you save a game in progress onto tape so you can continue it whenever you choose.

For ZX81 with 16K RAM £3.95
For 48K SPECTRUM £4.95

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. **Order today!** Money refunded if not delighted!

Send cash, P.O. or cheque to:

FELIX SOFTWARE (DEPT. SU12)

19 Leighton Avenue, Pinner, HA5 3BW.

£10 SPECTRUM £13

DUAL JOYSTICK INTERFACE £13

Why pay £35 for 2 interfaces when you can buy our **dual** interface for just £13.

Features

- ★ Compatible with any software that uses the cursor keys.
- ★ Compatible with any software that lists the Kempston joystick.
- ★ Allows you to use any Atari/Le Stick type joystick.
- ★ Eight Directions can be programmed in simple basic.
- ★ Free draw program & full instructions.
- ★ Save wear and tear on your keyboard.

Standard Joystick Interface £10

Features

- ★ Compatible with any software that lists the Kempston joystick.
- ★ Allows you to use an Atari/Le Stick type joystick.
- ★ Full instructions.

Interface Compatiable Software

★ The Wizards ★ Mazeman ★ Galactic Jailbreak
★ Warriors ★ Chopper Rescue ★ Labyrinth
★ Gold Digger ★ Time-Bandits ★ Confusion
★ Flight Simulation ★ VU-3D ★ Meteor Storm
★ Space Intruders ★ Specvaders ★ Night Flite
★ Startrail ★ Mazechase ★ Zzoom ★ 3D Tanx
★ Spectral Maze ★ Gnasher ★ Spectapede
★ Ground Attack ★ Leapfrog ★ Froggy ★ Meteroids
● Frogger ● Galaxians ● Gulpman ● Jet-pac
● Pssst ● Joust ● Knot in 3D ● ETX ● Mazeman
● Meteroids ● Astroblaster ● Blind Alley
● Cosmic Guerilla ● Cosmos ● Cyber Rats
● Frenzy ● Nightflite ● 3D Tunnel ● Time-Gate
● Spookyman ● Slippery Sid

★ Only dual interface ● Both interfaces

Dual Interface £13 + £1 p&p. **Standard Interface** £10 + £1 p&p.

State ZX-81/Spectrum

Send Cheques/P.O. to:

Jiles Electronics, 48 Parkway, Chellaston, Derby DE7 1QZ.

Overseas orders add £3.50 p&p.

Now you can take a new

AMERICAN look at your Sinclair!

With the new Timex Sinclair User magazine to link YOU into a huge network of American enthusiasts

Published monthly since May, Timex Sinclair User has taken the States by storm. It is packed full of news, reviews, programs and user information . . . linking you into the vast Timex Sinclair User network.

Remember, this is a new magazine written from the American viewpoint — but it could open up whole new horizons for you on your Sinclair enjoyment. Take the new American view by ordering right away and see how the U.S.A. welcomed the Sinclair!

Send to: TIMEX SINCLAIR USER, ECC Publications Ltd., 196-200 Balls Pond Road, London N1 4AQ

Yes, I want to subscribe to TIMEX SINCLAIR USER at the special U.K. rate of £20 for 12 issues delivered to my door.

Name ______________________

Address ______________________

____

____

timex sinclair user

I enclose a cheque/P.O. for £________

Please charge my credit card

Card Name__________ **Card Number**__________

Signature__________ **Date**__________

N.B. This offer applies to UK subscribers only. Overseas rates available on request.

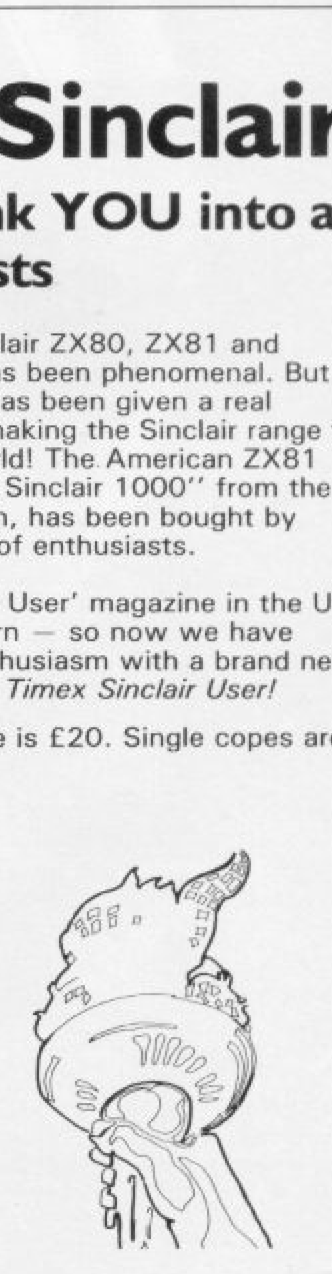
N.B. Subscribers to Sinclair Programs or Sinclair Projects should be aware that Timex Sinclair User will occasionally reproduce top articles that have appeared in our U.K. magazines.

The success of the Sinclair ZX80, ZX81 and Spectrum in the U.K. has been phenomenal. But in the States the Sinclair has been given a real American welcome — making the Sinclair range the biggest seller in the world! The American ZX81 equivalent: "The Timex Sinclair 1000" from the giant Timex organisation, has been bought by hundreds of thousands of enthusiasts.

The success of 'Sinclair User' magazine in the U.K. followed a similar pattern — so now we have matched the U.S.A. enthusiasm with a brand new U.S.A. magazine — *the Timex Sinclair User!*

Annual subscription rate is £20. Single copes are £2 (including P & P).

Fill in the order form NOW to discover the American way of computing!



SOFTWARE DIRECTORY

THIS MONTH *Sinclair User* begins a new service to readers – a software directory. Starting with this issue and continuing in future issues we will be publishing a list of all the software of which we know on the Sinclair market, with the machine on which it should be played, the publisher and the type of program.

If we have reviewed a cassette we shall give it a rating known at the Gilbert Factor, named after our software reviewer John Gilbert. Although the final figure is out of 10 it is the result of a complicated calculation involving a number of factors which are taken into account when assessing how good a cassette is.

The factors include value for money, the layout of the screen instructions, conciseness of the program and its speed of operation, the accomplishment of the task it aims to achieve, the innovation of concept, and the use it makes of the machine.

While trying to ensure that all software is dealt with it is inevitable that some will be omitted. We will remedy any omissions later. Lack of space means that we cannot publish the complete list in one issue. The remainder of the list will be published next month and we will repeat this month's one month later.

Any suggestions for its improvement will be welcomed.

Name	Machine	Company	Type	Gilbert factor
Accounts (Sole Trader)	48K Spec.	Hestacrest	Business	*
Accounts (Limited Company)	48K Spec.	Hestacrest	Business	*
Accounts (Sole Trader)	16K ZX-81	Hestacrest	Business	*
Accounts (Limited company)	16K ZX-81	Hestacrest	Business	*
Address Manager	48K Spec.	OCP	Business	7
Adventure 1	48K Spec.	Abersoft	Adven.	6
Adventure 1	16K ZX-81	Abersoft	Adven.	6
Airline	16K ZX-81	CCS	Sim.	*
Airline	48K Spec.	CCS	Sim.	*
Air Traffic Controller	16K Spec.	Hewson	Sim.	6
Alien Dropout	16K ZX-81	Silversoft	Arcade	*
Allsort S-1	48K Spec.	A Firminger	Utility	7
Alphabet	16K Spec.	Widget	Education	*
Arcadia	16K Spec.	Imagine	Arcade	5
Arcadian	16K Spec.	J K Greye	Arcade	*
Aspect	16K Spec.	Bug Byte	Utility	5
Assembler	48K Spec.	Artic	Utility	6
Asteroids	16K ZX-81	Silversoft	Arcade	*
Asteroids	16K ZX-81	Software Farm	Arcade	6
Astrology	16K Spec.	Stellar Servs.	Utility	7
Astrology	16K ZX-81	Stellar Servs.	Utility	*
Audio Sonics	16K Spec.	Work Force	Utility	4
Auto Chef	16K Spec.	CCS	Sim.	*
Auto Chef	16K ZX-81	CCS	Sim.	*
Avenger	16K Spec.	Abacus	Arcade	*
Backgammon	48K Spec.	CP	Mind Game	*
Backgammon	16K Spec.	Hewson	Mind Game	*
Bank Account Syst.	48K Spec.	K Gouldstone	Business	8
Bank Raid	16K ZX-81	J M Senior	Game	*
Barrow Quest	16K ZX-81	Sherry	Adven.	*
Base Invaders	48K Spec.	Work Force	Arcade	6
Battle of Britain	48K Spec.	Microgame	Strat.	*
Battleships	16K ZX-81	JRS	Strat.	*
Beamscan	48K Spec.	Hilderbay	Utility	*
Beamscan	16K ZX-81	Hilderbay	Utility	*
Big Match Soccer	16K Spec.	Winters	Strat.	*
Biorythms/Pyramids of Egypt	16K Spec.	Spectrasoft	Game	*
Black Crystal	48K Spec.	Carnell	Adven.	7
Black Crystal	16K ZX-81	Carnell	Adven.	7
Black Dwarf's Lair	48K Spec.	Newsoft	Adven.	*
Black Hole	16K Spec.	Quest	Arcade	6
Blind Alley	16K Spec.	Sunshine	Arcade	7
Brewery	48K Spec.	P Boulton	Strat.	*
Bridge Tutor	16K Spec.	CP	Mind Game	*
Business Bank Account	48K Spec.	Transform	Business	*
Business Bank				
Children's Compendium	16K Spec.	Dymond	Game	*
Collector's Pack	48K Spec.	Sinclair	Business	7
Colossal Caves	48K Spec.	CP	Adven.	*

Name	Machine	Company	Type	Gilbert factor
Compiler	48K Spec.	Softek	Utility	6
Conflict	48K Spec.	Martech	Strat	*
Conflict	16K ZX-81	Martech	Strat	7
Countries of the World	16K Spec.	Hewson	Utility	8
Cosmic Guerilla	16K Spec.	Crystal Comp	Arcade	8
Cosmos	16K Spec.	Abbex	Arcade	7
Copycat	1K ZX-81	Copycat	Utility	*
Counting	16K Spec.	Starter Soft	Education	*
Counting	16K Spec.	Widget	Education	*
Crevasse and Hotfoot	16K Spec.	Microsphere	Games	7
Critical Path Analysis	48K Spec.	Hilderbay	Business	*
Critical Path Analysis	16K ZX-81	Hilderbay	Business	6
Cruising	16K Spec.	Sunshine	Arcade	4
Cyber Rats	16K Spec.	Silversoft	Arcade	7
Cycle Planner	16K Spec.	Medidata	Utility	4
Dallas	16K Spec.	CCS	Sim.	6
Dallas	16K ZX-81	CCS	Sim.	6
Database	48K Spec.	Microl	Business	7
Demolition	16K ZX-81	Comp. Rntls.	Game	*
Derby Day	48K Spec.	Comp. Rntls.	Game	*
Destroyer	16K Spec.	Winters	Game	*
Dictator	16K Spec.	Bug-Byte	Strat.	*
Dietron	16K Spec.	Custom	Utility	6
Disassembler	16K Spec.	dK' Tronics	Utility	7
Display	16K Spec.	Work Force	Utility	*
DIY Book-keeping	48K Spec.	RAMTOP	Business	*
Do Not Pass Go	48K Spec.	Work Force	Strat.	6
Do Not Pass Go	16K ZX-81	Work Force	Strat.	*
Draft	16K ZX-81	Myrmidon	Business	*
Draughts	48K Spec.	CP	Mind Game	*
Dungeons of Doom	16K ZX-81	Woosoft	Adven.	*
Dungeon Master	48K Spec.	Crystal Comp.	Adven.	8
Dymonoids	16K Spec.	Dymond	Game	*
Editor/Assembler	16K Spec.	Picturesque	Utility	8
Educational	16K Spec.	Startersoft	Education	*
Engine Diagnostic	48K Spec.	Spectrasoft	Utility	*
Escape	16K Spec.	New Generation	Maze	8
Espionage Isl.	48K Spec.	Artic	Adven.	5
Espionage Isl.	16K ZX-81	Artic	Adven.	*
Ext	48K Spec.	Abbex	Arcade	6
Everest Ascent	48K Spec.	Shepard	Adven.	6
Evolution	48K Spec.	Microsphere	Game	*
Family Games Pack	16K Spec.	Hornby	Game	*
Farmer	16K Spec.	CCS	Sim.	*
Farmer	16K ZX-81	CCS	Sim.	*
Galaxy Conflict	48K Spec.	Martech	Strat.	*
Account	16K ZX-81	Transform	Business	*
Caterpillar	16K Spec.	CDS	Arcade	*
Calpac 1	16K Spec.	Calpac	Education	*
Calpac 2	16K Spec.	Calpac	Education	*
Calpac 3	16K Spec.	Calpac	Education	*
Calpac 1	16K ZX-81	Calpac	Education	*
Calpac 2	16K ZX-81	Calpac	Education	*

continued on page 134

continued from page 133

Name	Machine	Company	Type	Gilbert factor
Galaxy Conflict	16K ZX-81	Martech	Strat.	8
Gangsters	48K Spec.	P Boulton	Strat.	*
Gambling Tape	16K Spec.	Dymond	Game	*
Games 2	16K ZX-81	JRS	Game	*
Games Tape 1	1K ZX-81	J K Greye	Game	*
Games Tape 2	16K ZX-81	J K Greye	Game	*
Games Tape 3	16K ZX-81	J K Greye	Game	*
Games Pack 1	16K Spec.	A Burnham	Game	*
Games Tape 1	16K Spec.	Sospan	Game	*
Games Tape 2	16K Spec.	Sospan	Game	*
Games	16K ZX-81	P Teakle	Game	*
Ghost Hunt	16K Spec.	PSS	Arcade	*
Gobble-a-Ghost	16K Spec.	CDS	Arcade	*
Golf	16K Spec.	R & R	Sim.	7
Golf	16K Spec.	Virgin	Sim.	8
Gobbleman	16K Spec.	Artic	Arcade	*
Gobbleman	16K ZX-81	Artic	Arcade	*
Gobbler	16K ZX-81	Software Farm	Arcade	*
Gorilla	16K Spec.	D Hornsby	Game	*
Gnasher	16K Spec.	R & R	Maze	8
Graphics	16K ZX-81	IPA	Utility	*
Graphics Toolkit	16K ZX-81	JRS	Utility	9
Great Britain Ltd	48K Spec.	Hessel	Strat.	7
Great Britain Ltd	16K ZX-81	Hessel	Strat.	*
Greedy Gulch	16K ZX-81	Phipps	Adven.	7
Ground Attack	16K Spec.	Silversoft	Arcade	6
Ground Force Zero	16K Spec.	Titan	Arcade	*
Gulpman	16K Spec.	Campbell	Arcade	*
Gulp 2	16K ZX-81	Campbell	Arcade	*
Halls of Things	48K Spec.	Crystal Comp.	Adven	9
Heathrow	16K Spec.	Hewson	Sim.	8
High Noon	48K Spec.	Work Force	Arcade	9
High-resolution Graphics	1K ZX-81	P Moody	Utility	*
High-resolution Invaders	16K ZX-81	Odyssey	Arcade	*
Hitch Hikers' Guide to the Galaxy	48K Spec.	ESP	Adven.	6
Hobbit	48K Spec.	Sin/M. Hse.	Adven.	9
Horace and the Spiders	16K Spec.	Sinclair	Arcade	8
Horace Goes Skiing	16K Spec.	Sinclair	Arcade	8
Hungry Horace	16K Spec.	Sinclair	Arcade	8
Inca Curse	48K Spec.	Sinclair	Adven.	6
Inca Curse	16K ZX-81	Sinclair	Adven.	*
I Ching	48K Spec.	Sirius	Game	*
Inkos	48K Spec.	Chalksoft	Sim.	*
Integration	16K Spec.	University	Utility	8
Integration	16K ZX-81	University	Utility	8
Intermediate English 1	16K Spec.	Rose	Educ.	*
Intermediate English 1	16K ZX-81	Rose	Educ.	*
Intermediate English 2	16K Spec.	Rose	Educ.	*
Intermediate English 2	16K ZX-81	Rose	Educ.	*
Intermediate Maths 1	16K Spec.	Rose	Educ.	*
Intermediate Maths 1	16K ZX-81	Rose	Educ.	*
Intermediate Maths 2	16K Spec.	Rose	Educ.	*
Intermediate Maths 2	16K ZX-81	Rose	Educ.	*
Faust's Folly	16K Spec.	Abbex	Adven.	6
Fighter Pilot	16K ZX-81	Digital Int.	Sim.	5
Finance Manager	16K Spec.	OCP	Business	9
Flight Sim.	48K Spec.	Sinclair	Sim.	6
Flight Sim.	16K ZX-81	Sinclair	Sim.	6
Football	16K Spec.	Winters	Sim.	*
Football Manager	48K Spec.	Addictive Gms.	Sim.	7
Football Manager	16K ZX-81	Addictive Gms.	Sim.	*
Forth	48K Spec.	Abersoft	Lang.	9
Forth	48K Spec.	Sinclair	Lang.	7
Forth	16K ZX-81	Sinclair	Lang.	7

Name	Machine	Company	Type	Gilbert factor
Four Rules of Number	16K Spec.	Micro Master	Education	*
Four Rules of Number	16K ZX-81	Micro Master	Education	*
Froggy	16K ZX-81	DJL	Arcade	7
Froggy	16K Spec.	DJL	Arcade	7
Fruit Line	16K Spec.	P A Hanson	Game	*
Fruit Machine	16K Spec.	dK' Tronics	Game	6
Full-screen Breakout	1K ZX-81	New Generation	Arcade	*
Galaxians	16K Spec.	Artic	Arcade	6
Galaxian 5	16K Spec.	Abbex	Arcade	*
Invaders	16K ZX-81	Abersoft	Arcade	*
Invaders	16K ZX-81	Bug Byte	Arcade	*
Invaders	16K ZX-81	Silversoft	Arcade	*
Invasion Force	16K Spec.	Artic	Arcade	8
Jackpot	48K Spec.	Comp. Rntls.	Arcade	*
Johnny Reb	48K Spec.	Lothlorian	Sim.	*
Keysounder	16K Spec.	S and G	Utility	*
The Key	16K Spec.	Keysoft	Utility	*
Knight's Quest	48K Spec.	Phipps	Adven.	6
Knight's Quest	16K ZX-81	Phipps	Adven.	*
Krackit	16K Spec.	Artic	Adven.	4
Krackit	16K ZX-81	Artic	Adven.	4
Labyrinth	16K Spec.	Axis	Arcade	4
Language Devel. Series	16K Spec.	Glasson	Educ.	*
Language Devel. Series	16K ZX-81	Glasson	Educ.	*
Language Devel. Series	16K ZX81	Micro Master	Educ.	*
Language Devel. Series	16K Spec.	Micro Master	Educ.	*
Leap Frog	16K Spec.	CDS	Arcade	*
Linear Progging	16K Spec.	University	Utility	*
Linear Progging	16K ZX-81	University	Utility	*
Lost Island	16K ZX-81	JRS	Adven.	*
Machine Code Test Tool	16K Spec.	OCP	Utility	7
Machine Code Test Tool	16K ZX-81	OCP	Utility	*
Mad Martha	48K Spec.	Miko-Gen	Adven.	7
Magic Mountain	16K ZX-81	Phipps	Adven.	*
Mailing List	16K ZX-81	Hestacrest	Business	*
Masterfile	48K Spec.	Campbell	Business	8
Masterfile 16	16K Spec.	Campbell	Business	*
Matcalc	16K Spec.	Work Force	Utility	*
Matrix Operations	16K ZX-81	University	Utility	7
Matrix Operations	16K Spec.	University	Utility	7
Maths Tutor	16K Spec.	AD Software	Educ.	*
Maze Chase	16K Spec.	Hewson	Arcade	8
Maze Death Race	48K Spec.	PSS	Arcade	*
Maze Death Race	16K ZX-81	PSS	Arcade	*
Maze Man	16K ZX-81	Abersoft	Arcade	*
Mazogs	16K ZX-81	Bug Byte	Arcade	*
MCoder	16K Spec.	PSS	Utility	*
MCoder	16K ZX-81	PSS	Utility	*
Merchant of Venus	16K ZX-81	Crystal	Adven.	7
Meteoroids	16K Spec.	dK' 'Tronics'	Arcade	*
Meteoroids	16K Spec.	Softek	Arcade	6
Meteor Storm	16K Spec.	Quicksilva	Arcade	7
Mined Out	16K Spec.	Quicksilva	Arcade	7
Mines of Saturn/ Return to Earth	16K Spec.	Mikro-Gen	Adven.	*
Muncher	16K Spec.	Silversoft	Arcade	*
Muncher	16K ZX-81	Silversoft	Arcade	*
Namtir Raiders	16K ZX-81	Artic	Arcade	8
Night Gunner	16K ZX-81	Digital	Sim.	5
NightFlite	16K Spec.	Hewson	Sim.	5
Nowotnik Puzzle	16K Spec.	Phipps	Game	7
Nowotnik Puzzle	16K ZX-81	Phipps	Game	*
Odds-on	16K Spec.	RSD	Game	*
O Level Chemistry	48K Spec.	Calpac	Educ.	*
O Level Chemistry	16K ZX-81	Calpac	Educ.	*
O Level French Revision	16K ZX-81	Rose	Educ.	*
O Level Maths Revision	16K ZX-81	Rose	Educ.	*

Advertisement Index

sinclair supermart

THIS'LL TEACH YOU A LESSON!!

(...or two)

GCE O LEVEL/CSE Cassettes for the **48K SPECTRUM** with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £6·50	* Solids, Liquids and Gases * Vectors and Scalars * Acceleration	* Graphs of Motion * Gravity, Weight and Friction * Newton's Laws
CHEMISTRY 6 Programs for £6·50	* Chemical Change * Types of Reaction * Rate of Reaction	* Chemical Combination and the Mole * Chemical Equilibrium * Energy Changes

OR BOTH for £12

Cheque/PO payable THINK TANK Ltd.

think tank Educational Software

Dept SU9, 35 Wellington Road, Wimbledon Park, London SW19 8EQ.

TIRED OF JUST PLAYING GAMES?

Then put your ZX to some practical use with our range of easy-to-operate, functional software. Titles include:

★General File
★Pagepro System
-both versatile utility programs
★Personal Reminder
★Shopping List Index

For our latest catalogue send large SAE to:

SD Micro-Systems
PO Box 24, Hitchin, Herts SG4 0AE.

And do some **real** computing!

ZX-81 — SPECTRUM

ORIGINAL SOFTWARE URGENTLY NEEDED

Please send tape and SAE with description for evaluation. Good royalties.

AMELIA SOFTWARE

74 Dale Street, New Marske, Cleveland TS11 8EN.

EDUCATIONAL FUN FOR PRE/PRIMARY SCHOOL AGES

Countex — A fascinating game based on identifying familiar objects, counting, colour recognition, and simple arithmetic.

Opposites — More fun and games for young children with opposite words. Very entertaining and a valuable aid in reading and spelling.

Our games are designed to the highest standards:

Lively animated graphics in full colour
Full use of Spectrum sound and music
Lots of variety and random questions
Graded difficulty levels
Instant feedback on wrong replies
Help at the touch of a key
Rewarding graphic scoring systems

In short, your child will love our games because they are ENTERTAINING — the successful route to educational achievement.

Great **EDUCATIONAL VALUE** at £4.95 per tape

Cheque/P.O. (48K Spectrum only) to:
PB Systems, BEES Centre, Hay Lane,
Braintree, Essex CM7 5ST.

Spectrum — ZX-81

Overheating? Noisy? Keyboard runs hot?

Problem solved with the P.R. adaptor. No soldering, no dismantling, just plugs in place. **£8.95** please state model.

Cheques/P.O. to:
P. R. Electronics
14 Bretby Close,
Doncaster,
South Yorks DN4 6EL

FOOTBALL POOLS PREDICTOR

For 16K ZX-81

3+3 methods of prediction. Enter matches played and draws. Program lists in order of preference. Works on British and Australian results only £4.95.

DATA FILE

Holds 80 entries per side. Address book and labelling options. Common lines facility. Printer option. Ideal for small business, clubs or home etc. 16K ZX-81 only £4.95.

Matrix Software,
36 Yardley Wood Road, Moseley,
Birmingham, B13 9JB.

TO HELP YOU WIN THE POOLS

"**POOLSDATA**" results database.
Complete record of all English Football League results 1978–83. The teams, scores and actual date of over 10,000 matches, for your analysis. Simple format, with starter analysis programs and guidance notes.

Spectrum/ZX-81 (16K)
Tapes (2 years data) £7.50
Tapes (5 years data) £12.50

"**POOLSWINNER**" pools predictor.
Flexible, updatable prediction program which references an integral **10 year** database. Predicts draws, aways or homes. Can be tuned to your own unique formula, or used in simple mode.

Spectrum/ZX-81 (16K)
£15.00

S.A.E. for details or send cheques/POs to:
Selec Software
37 Councillor Lane
Cheadle
Cheshire

Phone Phone

SELEC SOFTWARE

ZX-81 MACHINE CODE SPECIALISTS

1K ZX-81 GAMES
THE BEST AVAILABLE

		TICK
• MAZE GUZZLER/SUPERBREAKOUT Superb Full Feature maze-chaser game, plus big-screen Breakout.	£3.50	☐
• THE INVADERS/TIMEBOMB Original space invaders, plus a new spine-chilling game.	£3.50	☐
• ZX-PANIC/ZX-SQUASH Two new big screen all action games.	£3.50	☐
• FREE CATALOGUE		☐

Please send the items ticked to:

Name ....
Address ....
....
....

I enclose cheque/PO for £..............................

SELEC SOFTWARE

37 Councillor Lane,
Cheadle, Cheshire
061-428 7425

IVYSOFT

is pleased to announce that it has moved to new premises at:

36 New Street,
Barbican,
Plymouth.

Mail order and telephone enquiries may still be made to:

91 Cleeve Drive,
Ivybridge,
Devon
(Telephone: (07554) 4088)

To celebrate our new opening, we will be offering a **10% discount on all orders received during August. Nearly 250 Spectrum programs in stock** including most of those advertised in this magazine. **Wide selection of programs for other micros,** including ZX-81. Telephone or send large SAE for our **free 15 page catalogue**.

Ask for details of our Software Club — Annual membership only £3.00 giving you a 10% discount on software.

8th ZX MICROFAIR
ALEXANDRA PALACE
SATURDAY AUGUST 20th

VISA

HOME STUDY LTD.

PROGRAMS AND DETAILS FROM:
TRELEIGH WOODS FARM
REDRUTH CORNWALL

48K SPECTRUM
PHYSICS 'O' LEVEL A.E.B. Syllabus 052 1983/4

8	TEACHING PROGRAMS (including games) C30 (EXCELLENT FOR ALL SYLLABUSES)		£8.40
8	PAPER 1 (multiple choice) PROGRAMS 400 questions	(C30)	£5.15
13	PAPER 2 (practical) PROGRAMS 39 questions	(C30)	£5.15
8	PAPER 3 (theory) PROGRAMS 128 questions	(C30)	£5.16

All programs feature instant answers, instant explanations, probable grade estimate.

WHEN YOU BUY THE COMPLETE SET (2 × C60) £22.00

WE GUARANTEE YOUR EXAMINATION SUCCESS

OR WE WILL REFUND THE FULL PURCHASE PRICE

RAMPACK REPAIRS

16K SINCLAIR RAMPACKS

Repaired as good as new. Just send your rampack, together with a brief description of the faults or problems, and we will give it our immediate attention. Why buy replacements, or wait for repairs?

Act now and get your computer back into business with our money back guarantee.

Only £8.00 including VAT and £1.50 p&p.

Send unit with PO or Cheque to:
Zeal Electronics Ltd,
Storforth Lane, Chesterfield,
Derbyshire S40 2TZ.

ANVIL COMPUTING

SUPERB NEW SELF TEACH PROGRAM

For ZX-81 (16K), Spectrum, TRS80, Video Genie.

★Now you can learn basic fast and efficiently★

★Forget your past programming problems. This program will make it all clear★

★ ★ ★ ★ ★ ★ ★

Cover Arrays, Sorting, Searching, Counting, Decision making tests, Error Trapping, Menu driving etc. You start with short simple programs and build up to full working programs with everything explained in full, precise detail.

★ ★ ★ ★ ★ ★ ★

★This is *NOT* a program you simply copy and run.★
★★*YOU HAVE GOT TO WORK!!*★★
But it is written in such a way that you can not get stuck.

★ ★ ★ ★ ★ ★ ★

This program has been fully tested over the past six months by 50 domestic and small business users and we have not received any adverse reports.

★ ★ ★ ★ ★ ★ ★

This program is our own product and is not available from any other source. Full money back guarantee. **£4.75** incl. Postage & Packing (state which computer).

51 Whitcliffe Lane, Ripon, Yorks HG4 2LB.

SPECTRASOFT SPECTRUM SOFTWARE VALUE FOR MONEY



Assassin. A new original real-time graphic game where you are awarded assassination contracts which you must complete to reap the rewards or suffer the penalties. Could you be the next "**Jackal**"? £5.00. **Biorhythms/Pyramids of Egypt** 16/48K £4.50. **Engine Diagnostic** 48K £4.50, **Character Generator** 16/48K £4.50, **Spectrasort** 16/48K. Very fast m/c sort £4.50 **M/C Tool Kit** deals with technical and screen problems £4.50. **Night Rider** m/c driving program. £4.50. Cheques and P/Os to **SPECTRASOFT**, Capital House, Market Place, London W3 6AL.

sinclair supermart

SPECTRUM ADDPACS

VERSATILE JOYSTICK INTERFACE
Easily included in basic games programs, including those in magazines. I/O facilities, can also be used as Burglar Alarm, etc! Interface and demo software **£12.95**. With Atari J/S **£19.95**.

TAPE CONTROLLER
Now your Spectrum can stop and start your recorder, loading the program of your choice. Access data from tape from within a program. LED level meter, perfect LOAD/SAVE without lead swapping. Plugs into REM socket on recorder **£19.95**.

BEEP BOOSTER
With LOAD/SAVE switching **£6.95**.

PROGRAM SAVER
Automatic battery back-up. No more crashes due to power failures! **£5.95**.

All products fully cased. SAE for data sheets. Mail order only, cheques payable to S. P. Gusterson.

ADDPAC ELECTRONICS
22 Watling Street, Towcester,
Northants NN12 7AF.

HORNBY SOFTWARE
PRO GOLF SERIES

1. **PRO GOLF** Spectrum game, 16K and 48K. Realistic game. Highly popular. 9-hole course. Choose your own club, miss the bunkers, water, out of bounds. **£4.95 incl. p&p.**

2. **TROON** Spectrum game, 48K only. Highly skilful. 18-hole championship course with graphics. To any handicap. As reviewed in August Sinclair User. **£6.95 incl. p&p.**

3. And now **ROYAL BIRKDALE 1983 BRITISH CHAMPIONSHIP COURSE.** Spectrum game, 48K only. Play with the pros. **£6.95 incl. p&p.**

Hornby Software
21 Pinfold Hill
Leeds LS15 0PW.

Tune your TV for optimum performance by using "TV COLOUR TUNE"—an educational and instructive program for the 48K Spectrum giving CROSS HATCH and COLOUR-BAR SIGNALS with relevant back-up of the physics of colour TV transmission

£3.75 each, or get one

FREE

with every 3 titles ordered

CHESS	48K ARTIC	£9.45
CHESS PLAYER	48K QS	£6.95
TIMEGATE	48K QS	£6.95
MINED OUT	48K QS	£4.95
STAR TREK	48K R+R	£4.95
MICRO CHESS	16K ARTIC	£6.95
GOBBLEMAN	16K ARTIC	£4.95
GOLF	16K R+R	£3.75
SPACE INTRUDER	16K QS	£4.95
METEOR STORM	16K QS	£4.95

We are now a major source of EDUCATIONAL programs ranging from INFANT to CSE/GCE. Top rate service and comprehensive supply only from:

LOCATOR, 12 Fernhall Drive, Redbridge, Essex 1G4 5BN. Tel: 01-550 5575.

The rate for classified advertising in the **Sinclair Supermart** is only £9.00 per single column centimetre.

ZX-81 REPAIR SERVICE

At last no need to wait for weeks, send your faulty ZX-81 for a fast reliable repair.

We will repair any ZX-81 kit or Ready Built Unit.

Please describe the fault briefly and send a cheque/postal order to:

NEXT COMPUTER SYSTEMS
88 Harvest Road
Englefield Green
Surrey TW20 0QR

ONLY £15.95 + p&p £1.75
fully guaranteed.

ZX UPGRADES

16K Spectrum owners (Issue 2) upgrade to 48K for £25. Alternatively send us your Spectrum (keyboard unit only, not power supply) and for £31 inc. you get upgrade *plus* a small mod on board to allow video signals at edge connector (not usually available) to drive a monitor. For video mod only send keyboard unit plus £5 inc. All by return post.

ZX UPGRADES, 252 Bankhead Road, Northallerton, North Yorkshire, DL6 1JE.

48K and 16K SPECTRUM EPROM CARD (4K)

The EPROM-CARD uses spare ROM space, so normal operation of Spectrum is not affected. Prices: Edge-Connector Version (plugs directly into Spectrum) £21.25, Motherboard Version £18.50, CTR Motor Controller Option + £3.45. Plug in RAM-Adapter £5.95.

PROGRAMMERS' EPROM (£9.95)
Ten Top Quality, User-Friendly Routines: Right & Left Scroll, Size, Memory, Renumber (inc. GOTO, GOSUB, etc.), Variables Dump, Word processor, Block Delete, Sprite (Universal Character Printer), Graphics Set.

NEW! ZX Spectrum EPROM PROGRAMMER (£28.75) and 25 volt P.S.U. (£7.75) DISSASSEMBLER EPROM (£9.95).

ALSO AVAILABLE ZX-81 EPROM CARD, Programmer and Toolkit EPROM.

S.A.E. Please for extra details. P&P 75p (U.K.) £2.00 (Overseas).

ORME ELECTRONICS
2 Barrigger Road, Camborne, Cornwall
Tel 0209 715034 or 087 257 2842

ZX81 SPECTRUM, DRAGON, BBC AND VIC SOFTWARE LENDING LIBRARY

We have for hire from 50p (inc. post) programs for your computer.

£5 life membership (less than the cost of a single game) brings you the SOFTWARE LENDING LIBRARY membership kit, catalogue and news letter.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks
Stating name, address and computer type.
All tapes used with manufacturers' permission.

16K ZX-81 plus printer, paper and leads and including £120 worth of software, eg. 3D Monster Maze, Black Crystal, Football Manager etc. Cost £220 will accept £110. Tel: Epsom 24420.

SINCLAIR BUILT ZX-81, still under guarantee plus Sinclair 16K RAM pack plus games tapes and magazine. Cost over £100. Sell for £60 o.n.o. write: Derwen Fawr, Milwr, Holywell, Clwyd.

16K ZX-81 manual, leads, magazines and add on calculator keyboard, all as new. Games including catacombs, well worth over £100, bargain £80 o.n.o. Contact 021-308 7389 (evenings).

16K ZX-81 with console, built in keyboard and power switch. Over £100 worth of software, 2 books, good condition, worth over £200, bargain at £100 o.n.o. Tel: Southampton (0703) 447371.

WANTED. Spectrum educational and games programs. Highest prices/commission paid. Let us make money for you! Send your tapes with S.A.E. to Essex Software, 16 Huntsmans Drive, Upminster, Essex. UPMH 20508.

SPECTRUM (48K) plus printer £130. **Software** collection of the best **Spectrum** programs available (Nearly 50 cassettes) £1.50 each. Send S.A.E. for list to Richard, 40 Dumpton Park Drive, Broadstairs, Kent.

SPECTRUM M/C SOFTWARE. Unique. 32 lines of 64 characters using **BASIC** print command in your programs, **£3.95.** Missile Attack, fast arcade game, **£3.65.** Specify 16/48K. P. Reynolds, Longfield, Cranbrook Common, Kent TN17 2AD.

16K ZX-81, complete with original packaging, power supply, leads, manual. Many tapes including 3D Monster Maze, Flight Simulation, Compiler, etc. Bargain at **£50.** Telephone: Marlow (Bucks) 4945.

16K ZX-81, manual, leads, 42 key keyboard fitted, inverse video switch, 15 cassettes, total value new over £150, only 8 months old, £75 o.n.o. Tel: 049161 2555 (Oxon).

16K ZX-81 "ZX-BOMBRALLY" motor rally: race with spectacular 3D driver's view. Also **"ZX-SUPERTREK"**: both m/c. **Cassette £2.95 each**, £3.95 both, s.a.e. for details: Robert Armitage, 105 Bramcote Drive, Beeston, Notts NG9 1DU.

16K SPECTRUM Adventure game. In three parts. More than **40K** of program. Fight Monsters etc. Eventually Dracula. Great 3-D graphics. Only £5.00 to: M. Dixon, 22 Clappers Meadow, Alfold, Surrey GU6 8HH.

BARGAIN MINT add-ons Sinclair RAM. £20 ZONX81 £15. Post included. Phone 0236 35451, except Tuesday.

LOCK-KEEPER for 48K Spectrum. An educational program to promote reasoning skills for adults/children. Fun at home or school. £4.95. Cheques/POs to J. J. Donoher, 33 Upton Drive, Chester CH2 1BY.

TREBLE CHANCE pools forecasting program for the 16K ZX-81. Proven winner. Special introductory offer. For quality cassette with full instructions, send £2.95 to M. A. George, 12 Donne Avenue, Spital, Bebington, Wirral L63 9YH.

METRICATION explains the metric system; **CONVERSION** changes everyday imperial to metric measurements **and vice-versa.** Two invaluable programs for the 16K ZX-81. Only **£3.95** from: I. LeBrocq, 19 Lytton Avenue, Letchworth, Herts SG6 3HT.

1K ZX-81 7 original Cassettes Album 10/6 new programs per cassette: Fun-Fair, Cars, Penny, Words, Numbers, Andy, Task Force. £1 sample cassette, List. S.A.E. Williams S(oftwares), 31 Melbourne Court, Anerley Road, London SE20 8AR.

ZX-81 WITH 16K RAM pack, Ferguson tape recorder, Hitachi 12" B/W T.V., complete home-set, ideal for beginner. Leads, manual and magazines. £100. Tel: Rayleigh 773473 (Essex).

PRINTER, ASR33 teletype, uses plain paper single sheet or roll, up to 72 columns, complete with interface and software. Ready to run on 16K ZX-81 £97. Tel: 0249 653682.

Reach an estimated readership of over 200,000 users per month for as little as £2.00*.

Or if you are starting your own small business advertise in the supermart for only £10.00.

Yes all you have to do is fill in the coupon below including your name, address and/or telephone number and send to: Supermart, Sinclair User, ECC Publications, 196–200 Balls Pond Road, London N1 4AQ.

Maximum 30 words.

Your advert will appear in the earliest possible edition.

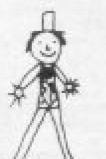
Name ....
Address ....
.... Tel: ....

Have you included the fee of £2.00 or £10.00?

***for second hand sales only**

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

TEACH YOUR CHILD



ZX Spectrum 16 or 48K

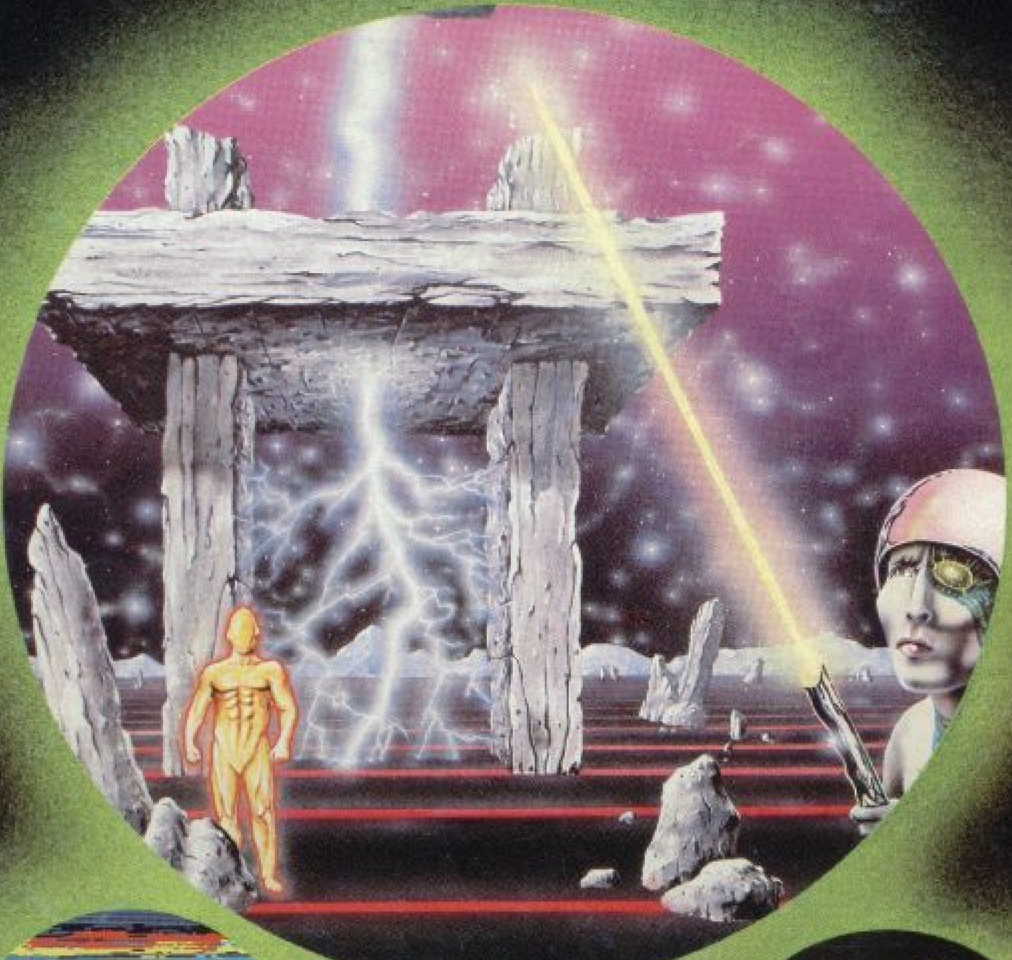
HIDDEN LETTERS Reading comprehension and spelling game	Age 5 on	£4.50
MONEY 3 levels	Age 3–10	£5.50
TELLING THE TIME 6 Levels, clock for child to set	Age 3–10	£5.50
LEARNING TO READ 1 4 All-graphics pre-reading games	Age 2–5	£5.50

POPPY PROGRAMS, Richmond House, Ingleton, Carnforth LA6 3AN
Computer Trade Association Member

AQUAPLANE
Aquatic Action!!
From the Author of Time-Gate

FREE UNIVERSE WITH EVERY TAPE*

*OFFER SUBJECT TO AVAILABILITY





VELNOR'S LAIR
Lose yourself in the Goblin Labyrinth amongst Demons, Trolls, Undead and the Evil Wizard Velnor.
A Warriors and Wizards, Sword and Sorcery Adventure. Runs in 48K on the Spectrum.
Author: **Derek Brewster** of Neptune Computing.
£6.95



3D STRATEGY
A Monster of an **Unbeatable** game! A 'State of the Art' program. A battle of Nerves and Wits; Faster than a speeding bullet!! 100% machine code version of 3D noughts and crosses. Runs in 16K on the Spectrum.
Author: **Freddy Vachha**
£6.95



PICTURE PRODUCED WITH BEEB ART

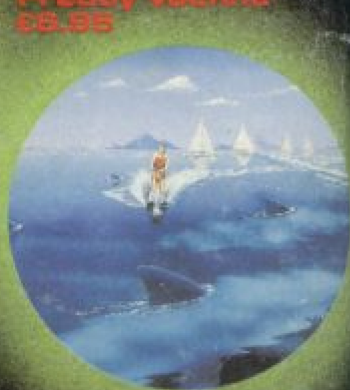
BEEB ART
High Quality Art/Design program for full versatile manipulation of the BBC's extensive graphics ability. Paint, Draw, Abstract. Instruction Book Included.
Runs in 32K on BBC Model 'B'.
Author: **Dave Mendes**
£14.95



XADOM
Battle through a sophisticated alien maze in a search for the 'aartifact'.
A Unique **3D** Arcade Adventure.
Runs in 48K on the Spectrum.
Author: **Mike Moscoff**
£6.95



SMUGGLERS COVE
Falling through a concealed cave entrance you find yourself caught in a fable full of horror and Black Beard's Treasure . . .
An Historical Adventure with Hi-Res Graphics.
Runs on 48K on the Spectrum.
Author: **John Keneally**
£6.95



AQUAPLANE
Ski thru' Marine Maniacs, G & T's, Regattas but beware the Great White Hungry!!
Unbelievable full screen display, continuous sound, 'impossible' colour.
Runs in 48K on the Spectrum.
Author: **John Hollis**
£6.95

QS™ THE GAME LORDS

AQUAPLANE 48K Spectrum	£6.95 ☐
XADOM 48K Spectrum	£6.95 ☐
VELNOR'S LAIR 48K Spectrum	£6.95 ☐
SMUGGLERS COVE 48K Spectrum	£6.95 ☐
3D STRATEGY 16K/48K Spectrum	£6.95 ☐
BEEB ART 32K BBC Model 'B'	£14.95 ☐

PLEASE SEND ME THE GAMES AS TICKED SUPPLIED ON CASSETTE
Total cheque/P.O. enclosed ____________
Cheque payable to Quicksilva Limited
NAME ____________
ADDRESS ____________

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale. Copies of which are available on request.

Please send order to
QUICKSILVA
Palmerston Park House, 13, Palmerston Road, Southampton SO1 1LL.

Send S.A.E. for Catalogue. QS Games are available through Boots, J. Menzies, Smiths, Hamleys, Laskys and all leading computer stores.